DEPARTMENT OF VETERANS AFFAIRS MEDICAL CENTER - WADE PARK 10701 EAST BLVD. CLEVELAND, OH. 44106

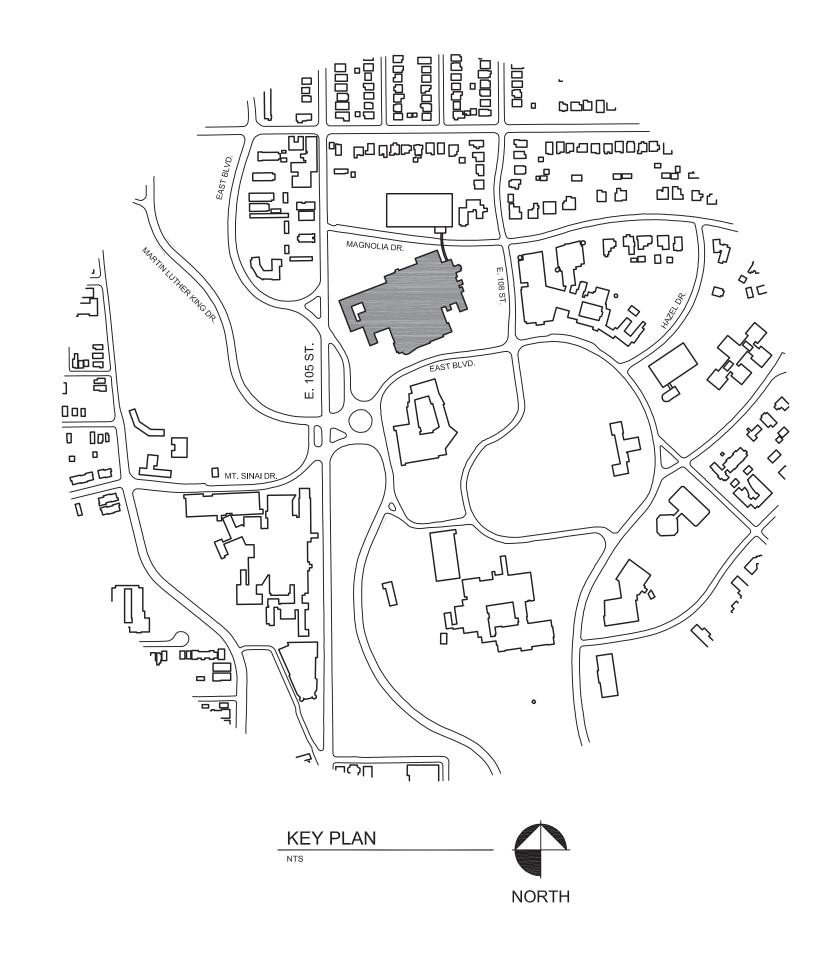
UPGRADE LEARNING EXCHANGE - PHASE 2

PROJECT NO. 541-13-106

# Veterans Administration Medical Center



VA FORM 08-6231, OCT 1978



Fredrick, Fredrick & Heller Engineers, Inc.

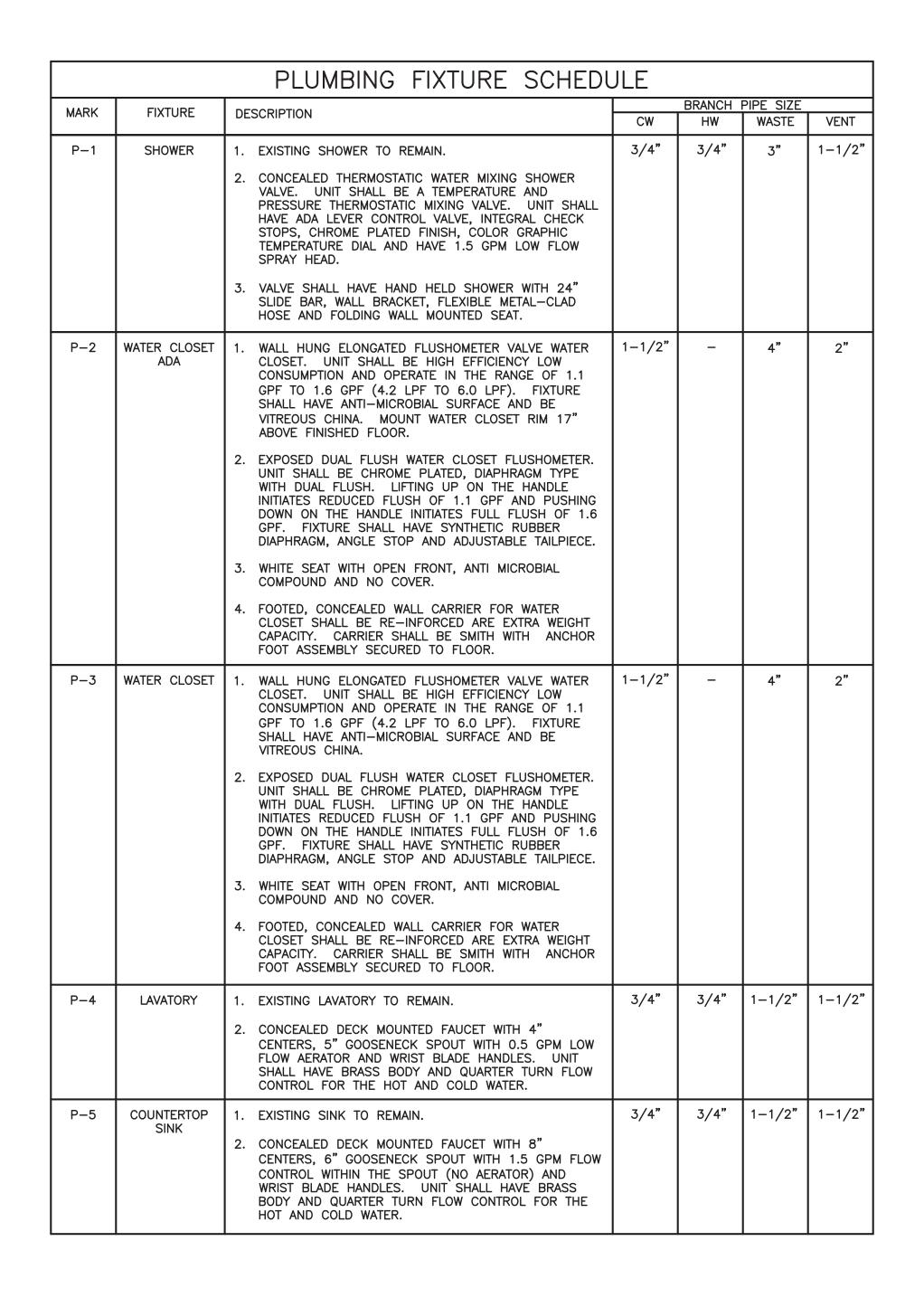
Mechanical & Electrical Engineer 672 East Royalton Road, Broadview Heights, Ohio 44147

## DRAWING INDEX

FINAL CD SUBMISSION - FOR CONSTRUCTION MARCH 29, 2013

PLUMBING DRAWINGS PLUMBING LEGEND AND SCHEDULE FIRST FLOOR PLUMBING, DEMOLITION AND NEW PLAN SECOND FLOOR PLUMBING, DEMOLITION AND NEW PLAN MECHANICAL DRAWINGS MECHANICAL LEGEND AND SCHEDULE MECHANICAL DETAILS HVAC CONTROL DETAILS FIRST FLOOR HVAC DEMOLITION PLAN FIRST FLOOR HVAC PLAN SECOND FLOOR HVAC DEMOLITION PLAN SECOND FLOOR HVAC PLAN **ROOF HVAC PLAN ELECTRICAL DRAWINGS ELECTRICAL LEGEND** FIRST FLOOR LIGHTING PLAN FIRST FLOOR POWER PLAN SECOND FLOOR ELECTRICAL PLANS ELECTRICAL ROOF PLAN POWER DISTRIBUTION ONE-LINE DIAGRAM

	DI	APPROVALS  IRECTOR 00	DATE	APPROVALS  CHIEF Planning and Construction	DATE	APPROVALS  FACILITY MANAGER	DATE	COVER SHEET	VAMC UPGRADE LEARNING EXCHANGE - PHASE 2	Project Number 541-13-106  Building Number 1	Office of Facilities Management
FINAL CD SUBMISSION	03-29-13	SSOCIATE DIRECTOR 00A (B)		CHIEF, Occupational Health & Safety		SHOP FOREMAN 138		Approved: Division Chief	Location VAMC - WADE PARK	Drawing Number  1-X0	
	12-28-12 CH	HIEF, ENGINEERING 138		CHIEF, IRM				Approved: Service Director	Date 03-29-13    Checked   Drawn   JWF	1-20	Department of Veterans Affairs



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### **MECHANICAL SYMBOLS:**

REFERENCE TO CODED NOTE EQUIPMENT — EQUIPMENT OR FIXTURE MARK ➤ UNIT NUMBER ——SAN—— SANITARY WASTE ---V--- PLUMBING VENT CONNECT TO EXISTING LIMIT OF DEMOLITION PLUMBING CONTRACTOR FIRE SUPPRESSION CONTRACTOR HVAC CONTRACTOR TEMPERATURE CONTROL CONTRACTOR GENERAL TRADES CONTRACTOR ELECTRICAL CONTRACTOR VENT THROUGH ROOF ABOVE FINISHED FLOOR FLOOR DRAIN EXISTING TO REMAIN EXISTING TO BE REMOVED -\*-\*-\*-\*-\*-EXISTING TO BE RELOCATED -x x x x x x x EXISTING NEW LOCATION —————

## PLUMBING GENERAL NOTES:

ISOLATION VALVE

BRANCH PIPE CONNECTION

- A. LOCATIONS AND ROUTING OF EXISTING PIPING, DUCTWORK AND EQUIPMENT IS PRESUMED FROM EXISTING DRAWINGS. MECHANICAL CONTRACTOR SHALL FIELD VERIFY ALL PRIOR TO COMMENCEMENT OF CONSTRUCTION. NOTIFY ENGINEER OF ANY CONDITIONS WHICH WILL NOT PERMIT THE WORK TO BE PERFORMED AS INDICATED ON THESE DRAWINGS.
- B. COORDINATE ALL SHUT-DOWNS OF EXISTING MECHANICAL SYSTEMS WITH OWNER A MINIMUM OF SEVEN WORKING DAYS IN ADVANCE.
- OWNER AND ARCHITECT.

C. PRIOR TO INSTALLATION, VERIFY PRECISE LOCATION OF NEW WALL MOUNTED DEVICES WITH

- D. PROVIDE ADEQUATE SERVICE CLEARANCE FOR ALL MECHANICAL EQUIPMENT. REFER TO INSTRUCTIONS FROM THE EQUIPMENT MANUFACTURER.
- E. NEW PIPING SHALL NOT BE ROUTED ABOVE ELECTRICAL PANELS. REFER TO ELECTRICAL
- DRAWINGS FOR LOCATION OF PANELS. F. WHERE EXISTING FIXTURES ARE TO BE REMOVED, REMOVE ALL ASSOCIATED BRANCH PIPING WHICH IS NOT TO BE REUSED. REMOVE PIPING TO MAINS AND CAP REMAINING PIPES.
- G. INSTALL WATER HAMMER ARRESTERS IN DOMESTIC HOT AND COLD WATER PIPING AT EACH GROUP OF PLUMBING FIXTURES. SIZE AND LOCATE WATER HAMMER ARRESTERS ACCORDING
- H. WHERE EXISTING PIPING IS TO BE REMOVED, ALL OPENINGS LEFT IN ANY FLOOR, WALL AND ROOF PENETRATIONS SHALL BE FILLED AND PATCHED TO MATCH SURROUNDING SURFACES. I. EXISTING CONSTRUCTION IS CONCRETE POST TENSION SLAB. REFER TO GENERAL TRADE

## FOR CONSTRUCTION

Date

one eighth inch = one foot

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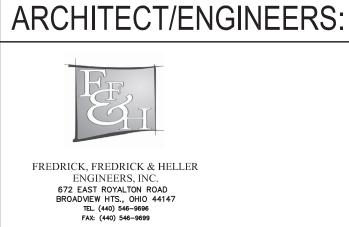
Revisions:

VA FORM 08-6231

CONSULTANTS: FINAL CD SUBMISSION 03-29-13



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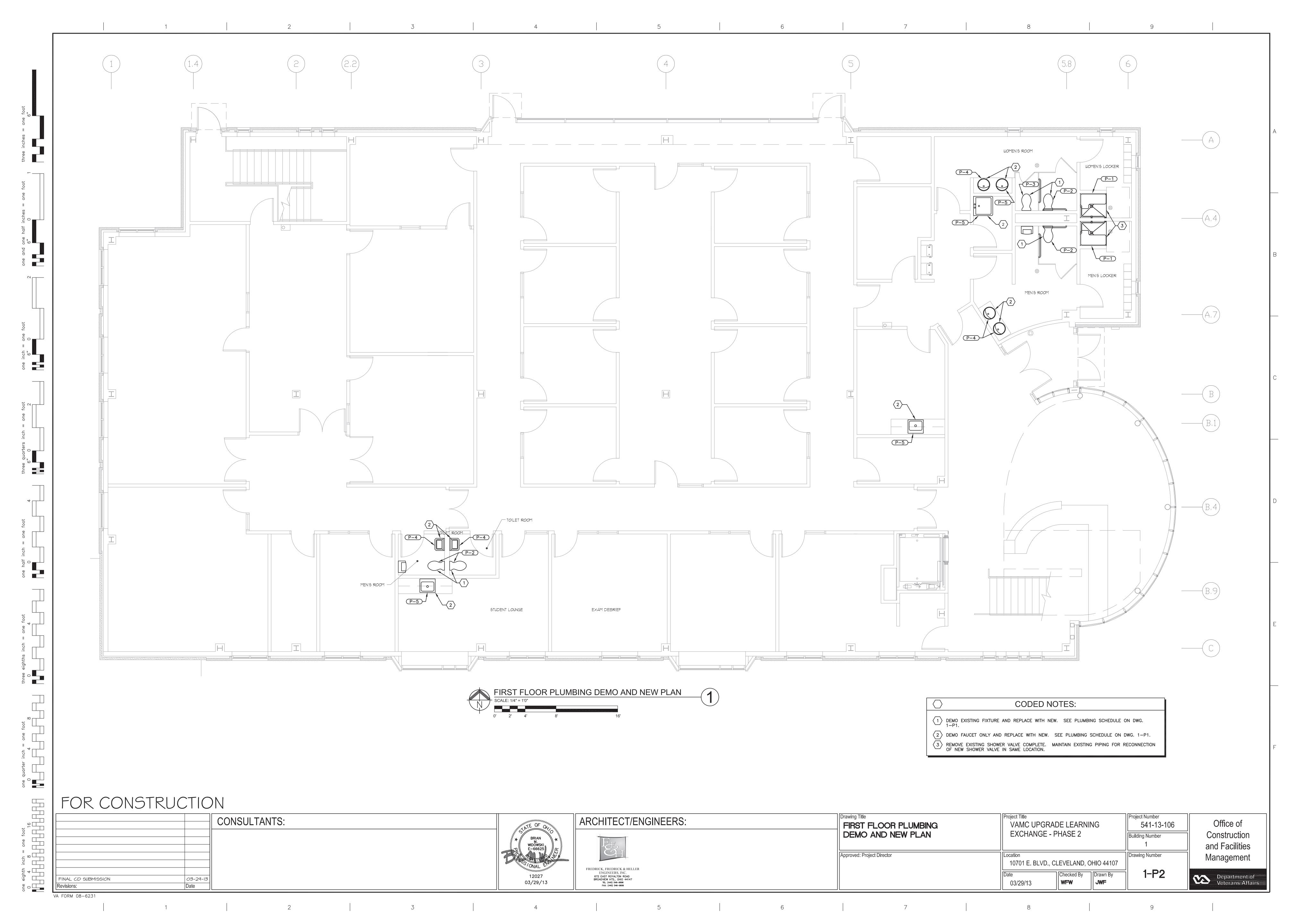


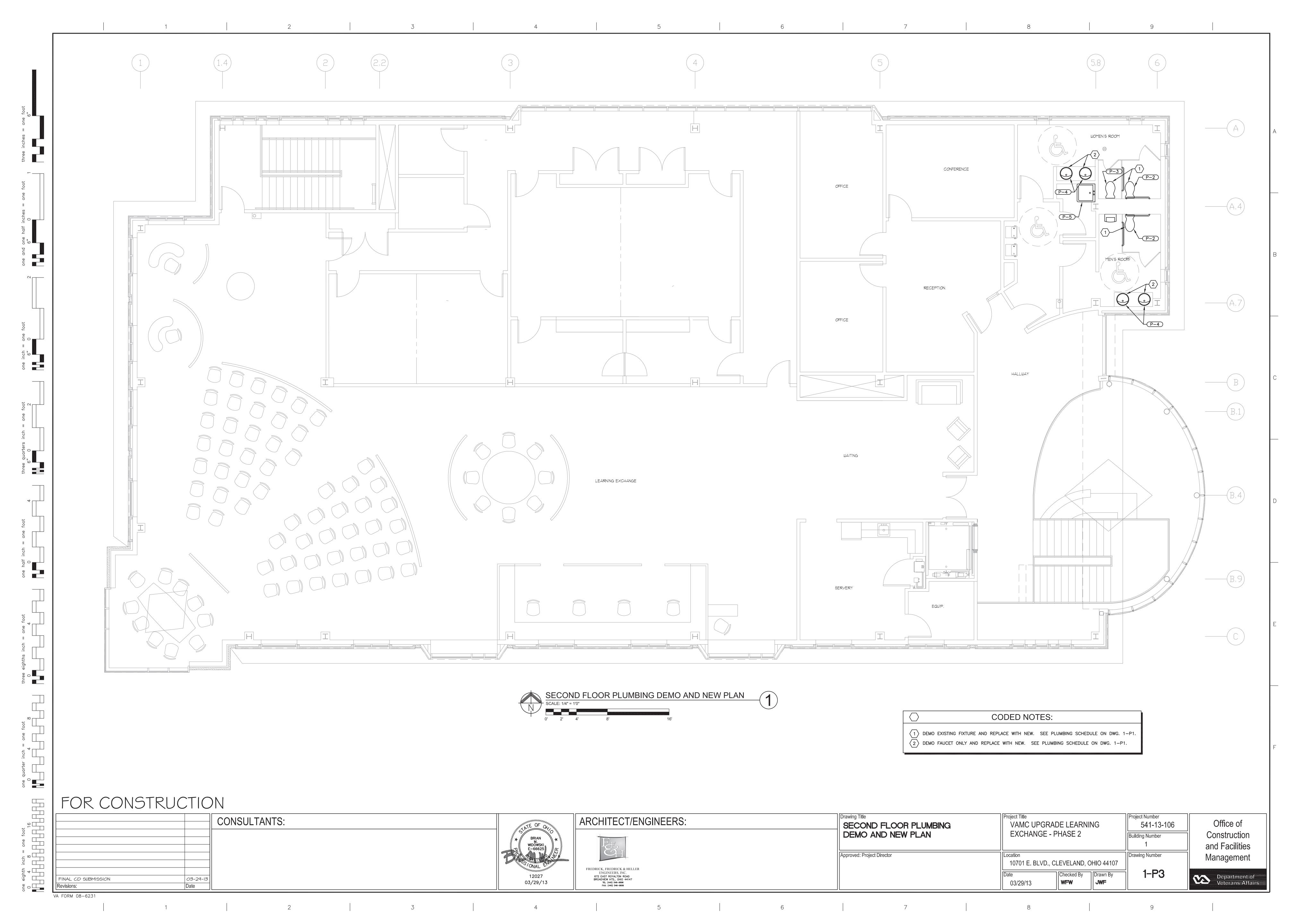
PLUMBING LEGEND AND SCHEDULE Approved: Project Director

Project Title Project Number VAMC UPGRADE LEARNING 541-13-106 EXCHANGE - PHASE 2 | Building Number Drawing Number Location 10701 E. BLVD., CLEVELAND, OHIO 44107 Checked By Drawn By 03/29/13 WFW

REQUIREMENTS FOR NEW PENETRATIONS.

Office of Construction and Facilities Management





#### MECHANICAL SYMBOLS:

#### **ARRREVIATIONS**

<u>ABBREVIATIO</u>	<u>NS:</u>
AC AD AFF AHU AP ATU CF CD CO CFM CUH CW Db DDC	AIR CONDITIONING UNIT ACCESS DOOR ABOVE FINISHED FLOOR AIR HANDLING UNIT ACCESS PANEL AIR TERMINAL UNIT (ie VAV, DUAL DUCT BOX, ETC.) CENTRIFUGAL FAN COOLING COIL CONDENSATE CLEAN OUT CUBIC FEET PER MINUTE CABINET UNIT HEATER COLD WATER DRY BULB TEMPERATURE DIRECT DIGITAL CONTROL
DDC dB Dp	DECIBELS DEW POINT TEMPERATURE
DX EA EF EX.	DIRECT EXPANSION EXHAUST AIR EXHAUST FAN EXISTING
FC FLR. FD	FORWARD CURVED FAN FLOOR FIRE DAMPER
FSD GPM HC HP	COMBINATION FIRE/SMOKE DAMPER GALLONS PER MINUTE HEATING COIL HORSEPOWER
MAX. MIN. N.T.S.	MAXIMUM MINIMUM NOT TO SCALE
NOM. OA PD	NOMINAL OUTDOOR AIR PRESSURE DROP
PF PH	PRE-FILTER PREHEAT
RA REA RF	RETURN AIR RELIEF AIR RETURN FAN
RH Rh RTU	REHEAT COIL RELATIVE HUMIDITY ROOFTOP UNIT
SA Sp. Gr. SP	SUPPLY AIR SPECIFIC GRAVITY STATIC PRESSURE
SPS SS	STATIC PRESSURE SENSOR STAINLESS STEEL
TCP VD VFD	TEMPERATURE CONTROL PANEL VOLUME DAMPER VARIABLE FREQUENCY DRIVE
Wb X	WET BULB TEMPERATURE EXISTING EXISTING TO BE REMOVED
XR XRI	EXISTING TO BE REMOVED  EXISTING TO BE REMOVED

#### **GENERAL SYMBOLS:**

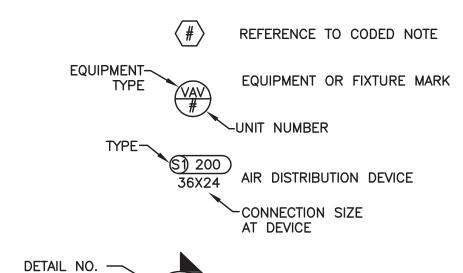
---- EXISTING TO BE REMOVED

---- EXISTING TO BE RELOCATED

POINT OF CONNECTION BETWEEN NEW AND EXISTING WORK
LIMIT OF DEMOLITION
EXISTING TO REMAIN

EXISTING TO BE RELOCATED

## CALL OUTS:



DRAWING

## **DUCTWORK SYMBOLS:**

24x18 RECTANGULAR DUCT SIZE 12"ø ROUND DUCT SIZE

MANUAL BALANCING DAMPER ON DUCT TO BE MOUNTED OVER ACCESSIBLE CEILING

SECTION/DETAIL/ELEVATION MARK

SINGLE LINE INDICATES TRANSITION

#### **CONTROL SYMBOLS:**

PNEUMATIC THERMOSTAT DDC THERMOSTAT

DN SUPPLY DUCT (UP & DOWN)

DN EXHAUST DUCT (UP & DOWN)

- SENSOR
- ELECTRONIC TEMPERATURE SENSOR

## VAV TERMINALS (VAV)

		MAX.	MIN.	TERMINAL	CONTROL	ELECTRIC HEATING COIL PERFORMANCE							
	MARK	AIRFLOW (CFM)	AIRFLOW (CFM)	TYPE (NOTE 2)	TYPE (NOTE 5)	AIRFLOW (CFM)	CAPACITY (MBH)	ENTERING AIR TEMP (*F)	LEAVING AIR TEMP (*F)	POWER (KW)	VOLTAGE (V)		
	NOT USED	_	-	-	_	_	_	_	-	-			
	NOT USED	_	_	_	_	_	_	_	-	_			
	NOT USED	_	_	-	_	_	_	-	_	_			
	VAV-4	1700	500	E	1	1500	70.9	55.0	99.0	22.0	480-3Ø		
RTU-4	VAV-5	400	120	В	1	120	5.8	55.0	100.0	2.0	277 <b>–</b> 1Ø		
RTU	VAV-6	600	180	С	1	350	16.9	55.0	100.0	5.0	277-1Ø		
	VAV-7	350	350	В	1	350	16.8	55.0	99.0	5.0	277 <b>–</b> 1Ø		
	VAV-11	200	60	Α	1	60	2.2	55.0	89.0	1.0	277-1Ø		
	VAV-12	300	90	Α	1	90	1.9	55.0	75.0	1.0	277-1Ø		
	VAV-13	500	150	В	1	150	3.2	55.0	75.0	1.0	277 <b>–</b> 1Ø		
	VAV-14	675	200	С	1	200	24.7	55.0	101.0	8.0	277-1Ø		
1-1	VAV-15	600	180	В	1	300	14.7	55.0	100.0	5.0	277 <b>–</b> 1Ø		
RTU-	VAV-16	390	120	В	1	150	6.9	55.0	98.0	3.0	277 <b>–</b> 1Ø		
	VAV-17	500	150	Е	1	350	17.1	55.0	100.0	5.0	277 <b>–</b> 1Ø		
	VAV-18	425	130	В	1	150	7.0	55.0	98.0	3.0	277–1Ø		
	VAV-19	350	100	В	1	120	11.7	55.0	98.0	4.0	277 <b>–</b> 1Ø		
	VAV-20	400	120	В	1	250	12.3	55.0	101.0	4.0	277 <b>–</b> 1Ø		
	VAV-8	400	400	В	1	400	12.4	55.0	84.0	4.0	277-1Ø		
	VAV-9	1600	500	Е	1	1000	57.1	55.0	108.0	18.0	480-3Ø		
3	VAV-21	525	160	В	1	160	3.5	55.0	75.0	2.0	277 <b>–</b> 1Ø		
RTU	VAV-22	1500	200	D	1	1000	52.5	55.0	104.0	16.0	480-3Ø		
Ľ	VAV-23	525	160	В	1	160	3.5	55.0	75.0	2.0	277–1Ø		
	VAV-24	250	75	Α	1	75	1.6	55.0	75.0	1.0	277–1Ø		
	VAV-25	150	75	Α	1	75	1.6	55.0	75.0	1.0	277 <b>–</b> 1Ø		
	VAV-26	600	350	В	1	350	15.7	58.0	100.0	5.0	277 <b>–</b> 1Ø		
	VAV-27	625	300	В	1	300	13.0	58.0	98.0	4.0	277 <b>–</b> 1Ø		
	VAV-28	2085	300	Е	1	600	28.3	58.0	102.0	9.0	480-3Ø		
	VAV-29	1940	1200	Е	1	1200	33.5	58.0	84.0	11.0	480-3Ø		
RTU-2	VAV-30	150	85	Α	1	85	2.4	58.0	84.0	1.0	277 <b>–</b> 1Ø		
RT	VAV-31	150	85	Α	1	85	2.4	58.0	84.0	1.0	277 <b>–</b> 1Ø		
	VAV-32	515	195	В	1	195	5.4	58.0	84.0	2.0	277 <b>–</b> 1Ø		
	VAV-33	545	205	С	1	205	5.8	58.0	84.0	2.0	277–1Ø		
	VAV-34	50	40	Α	1	40	1.8	58.0	100.0	1.0	277-1Ø		
	VAV-35	365	225	В	1	225	10.3	58.0	101.0	4.0	277-1Ø		
	VAV-36	510	445	В	1	445	12.7	58.0	84.0	5.0	277 <b>–</b> 1Ø		

#### **VAV TERMINAL NOTES:**

- 1. TERMINALS SHALL BE CAPABLE OF OPERATING WITH A MINIMUM INLET PRESSURE OF 0.5 IN. W.G. PROVIDE WITH
- SCREW ACCESS (UN-HINGED) WHERE TERMINALS ARE INSTALLED IN THE BEAM/JOIST SPACE. 2. REFER TO "VARIABLE AIR VOLUME TERMINALS: CONNECTION SCHEDULE" FOR TERMINAL SIZE, DUCT CONNECTIONS AND
- 3. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.
- 4. ALL VAVS SHALL BE SELECTED WITH A MINIMUM 2-ROW REHEAT COIL. 5. REFER TO CONTROLS DRAWINGS FOR CONTROL STRATEGIES.

6. PROVIDE DOOR INTERLOCK DISCONNECT SWITCH.

## VARIABLE AIR VOLUME TERMINALS : CONNECTION SCHEDULE

***	- / 111 1 1 0 2 0	···	<u></u>	1112011011	001120022			
	IN	LET	MAX AIRFLOW	TERMINAL	RADIATED NOISE	DISCHARGE		
TERMINAL TYPE	TERMINAL NECK SIZE (IN)	SUPPLY DUCT (IN)	(CFM)	AIR PRESSURE DROP (IN W.G.)	(NC)	TERMINAL CONN. SIZE (IN)	DISCHARGE DUCT (IN)	
Α	6 <b>"</b> ø	8"ø	350	1.0"	25	12x8	10x10	
В	8"ø	10 <b>"</b> ø	700	1.0"	27	12×10	12x12	
С	10 <b>"</b> ø	12 <b>"</b> ø	1200	1.0"	28	14x12.5	20x10	
D	12 <b>"</b> ø	14"ø OR 16x10	1600	1.0"	30	16x15	22x12	
E	14"ø	18×12	2400	1.0"	30	20x18	30x12	
F	16 <b>"</b> ø	24×12	3200	1.0"	25	24x18	30x14	

- 1. UNLESS OTHERWISE NOTED ON PLANS, PROVIDE DUCT SIZES AS INDICATED. CONTRACTOR IS PERMITTED
- TO UTILIZE AN EQUIVALENT FREE AREA AS NECESSARY. CONTRACTOR SHALL PROVIDE ALL TRANSITIONS/OFFSETS AS NECESSARY.

## PACKAGED ROOFTOP UNITS (RTU)

MARK	RTU-1	RTU-2	RTU-3	RTU-4
TYPE	VERTICAL	VERTICAL	VERTICAL	VERTICAL
SUPPLY FAN				
SUPPLY AIR FLOW (CFM)	4000	8000	4000	4000
MINIMUM OUTDOOR AIR FLOW (CFM)	1000	2800	1000	1000
TOTAL/EXTERNAL STATIC PRESSURE (IN W.G.)	1.91/1.2	3.51/2.0	1.91/1.2	1.91/1.2
BRAKE HORSEPOWER/TYPE	3/ECM		3/ECM	3/ECM
RPM	1,211	2,230	1,211	1,211
DX COOLING				
TOTAL CAPACITY (MBH)	129.2	213.6	129.2	129.2
SENSIBLE CAPACITY (MBH)	101.4	179.7	101.4	101.4
ENTERING AIR (DB/WB °F)	80/67	80/67	80/67	80/67
OUTDOOR TEMPERATURE (* F)	95	95	95	95
REFRIGERANT	R-410A	R-410A	R-410A	R-410A
NO. COMPRESSORS/TYPE	2/INVERTER SCROLL	2/SCROLL	2/INVERTER SCROLL	2/INVERTER SCRO
NO. CONDENSER FANS/MOTOR TYPE	2/ECM	2/	2/ECM	2/ECM
ENERGY RATING STANDARD CONDITIONS (EER)/IEER	12.3/19.2	11.0/11.8	12.3/19.2	12.3/19.2
GAS HEAT				
INPUT/OUTPUT (MBH)	200/160	240-192	200/160	200/160
NO. OF STAGES	2	2	2	2
ELECTRICAL				
VOLTS-PHASE-HERTZ	460-3-60	460-3-60	460-3-60	460-3-60
MINIMUM AMPACITY	23.2	46.2	23.2	23.2
MAX. OVERCURRENT PROTECTION (AMPS)	30	50	30	30
OPERATING WEIGHT (LBS.)	2,430	2,950	2,430	2,430
FEATURES OR ACCESSORIES				
5 YEAR COMPRESSOR WARRANTY	YES	YES	YES	YES
INTERNAL SPRING VIBRATION CURB	YES	YES	YES	YES
2-INCH, 30% STANDARD SIZE THROWAWAY FILTERS	YES	YES	YES	YES
BAROMETRIC RELIEF	YES	YES	YES	YES
FULL ECONOMIZER	YES	YES	YES	YES
FACTORY DISCONNECT	NO	NO	NO	NO
BACNET INTERFACE (ANDOVER CONTROLS)	YES	YES	YES	YES

- SINGLE POINT POWER CONNECTION. SLIDE OUT, STAINLESS STEEL DRAIN PAN.
- BUILT-IN RIGGING CAPABILITIES.
- 10-YEAR HEAT EXCHANGER WARRANTY. PROVIDE WITH THROUGH THE BASE ELECTRICAL, TIME DELAY RELAY. ANTI-SHORT CYCLE TIMER, LOW AMBIENT CONTROL, CONDENSER COIL GUARD,
- HINGED SERVICE ACCESS DOORS. 6. RETURN AIR SMOKE DETECTOR, DISCONNECT, AND CONVENIENCE RECEPTACLE
- BY EC. REFER TO ELECTRICAL PLANS.
- COMPRESSORS MODULATING WITH INVERTER. CONDENSER FAN HEAD PRESSURE CONTROL.
- 9. ADAPTER CURB. 10. ELEVATION: 1000 FT.

11. REFER TO SPECIFICATIONS FOR ADDITIONAL INFORMATION.

#### **HVAC GENERAL NOTES:**

- A. LOCATIONS AND ROUTING OF EXISTING PIPING, DUCTWORK AND EQUIPMENT IS PRESUMED FROM EXISTING DRAWINGS. MECHANICAL CONTRACTOR SHALL FIELD VERIFY ALL PRIOR TO COMMENCEMENT OF CONSTRUCTION. NOTIFY ENGINEER OF ANY CONDITIONS WHICH WILL NOT PERMIT THE WORK TO BE PERFORMED AS INDICATED ON THESE DRAWINGS.
- B. COORDINATE ALL SHUT-DOWNS OF EXISTING MECHANICAL SYSTEMS WITH OWNER A MINIMUM OF TEN WORKING DAYS IN ADVANCE.
- C. PRIOR TO INSTALLATION, VERIFY PRECISE LOCATION OF NEW WALL MOUNTED DEVICES WITH OWNER AND ARCHITECT. REFER TO ARCHITECTURAL REFLECTED CEILING PLAN FOR PRECISE LOCATION OF CEILING MOUNTED DEVICES. COORDINATE ROOF MOUNTED EQUIPMENT WITH ARCHITECT PRIOR TO INSTALLATION.
- D. PROVIDE ADEQUATE SERVICE CLEARANCE FOR ALL MECHANICAL EQUIPMENT. REFER TO INSTRUCTIONS FROM THE EQUIPMENT MANUFACTURER. MAINTAIN A MINIMUM OF 18 INCH CLEARANCE AT CONTROLS FOR VARIABLE AIR VOLUME TERMINALS AND VENTURI VAV
- E. NEW DUCTS OR PIPING SHALL NOT BE ROUTED ABOVE ELECTRICAL PANELS. REFER TO ELECTRICAL DRAWINGS FOR LOCATION OF PANELS.
- F. UNLESS NOTED OTHERWISE, BRANCH DUCTS TO DIFFUSERS SHALL BE THE SAME SIZE AS THE NECK OF THE DIFFUSER.
- G. NO TEMPERATURE SENSING CONTROL DEVICES SHALL BE LOCATED OVER HEAT PRODUCING
- H. MECHANICAL DRAWINGS ARE DIAGRAMMATIC. WHERE DUCT SIZE SHOWN IS IN CONFLICT WITH STRUCTURE OR OTHER BUILDING SYSTEM, CONTRACTOR MAY MODIFY DUCT SIZE AND PROVIDE EQUIVALENT FREE AREA DUCT.
- . WHERE EQUIPMENT IS TO BE REMOVED, REMOVE ALL ASSOCIATED PIPING, DUCTWORK, CONTROLS, CONCRETE PADS, SUPPORTS, ETC. PATCH WALL AND FLOOR OPENINGS TO MATCH ADJACENT SURFACES.
- J. CONTRACTOR SHALL REMOVE AND REPLACE CEILING TILES AND GRID AS REQUIRED TO COMPLETE DEMOLITION AND NEW WORK IN AREAS OUTSIDE OF RENOVATION PROJECT. CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACING ANY TILES OR GRID DAMAGED DUE TO

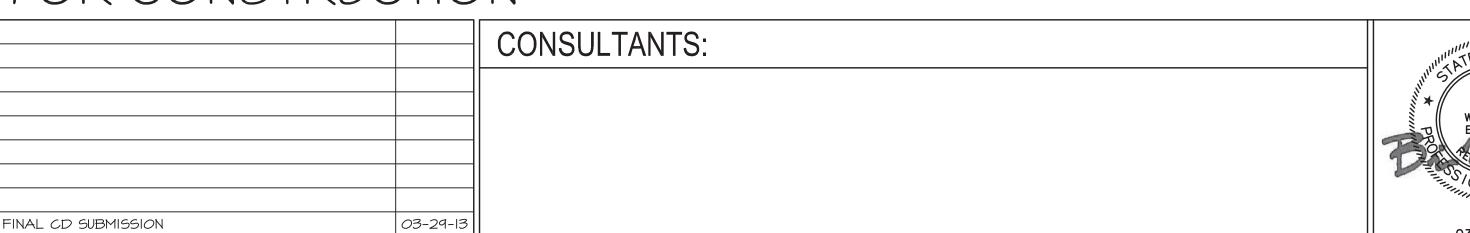
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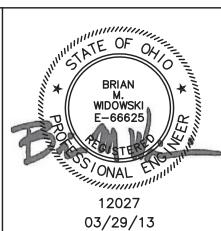
# FOR CONSTRUCTION

one eighth inch = one foot

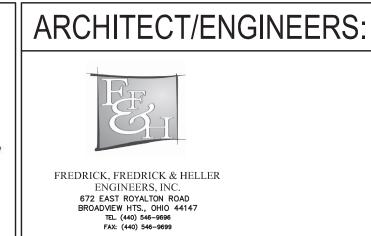
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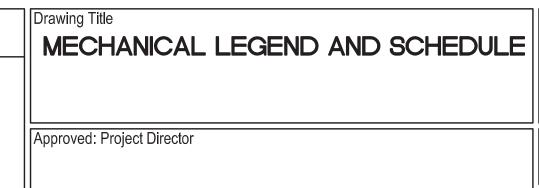
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THIS WORK.

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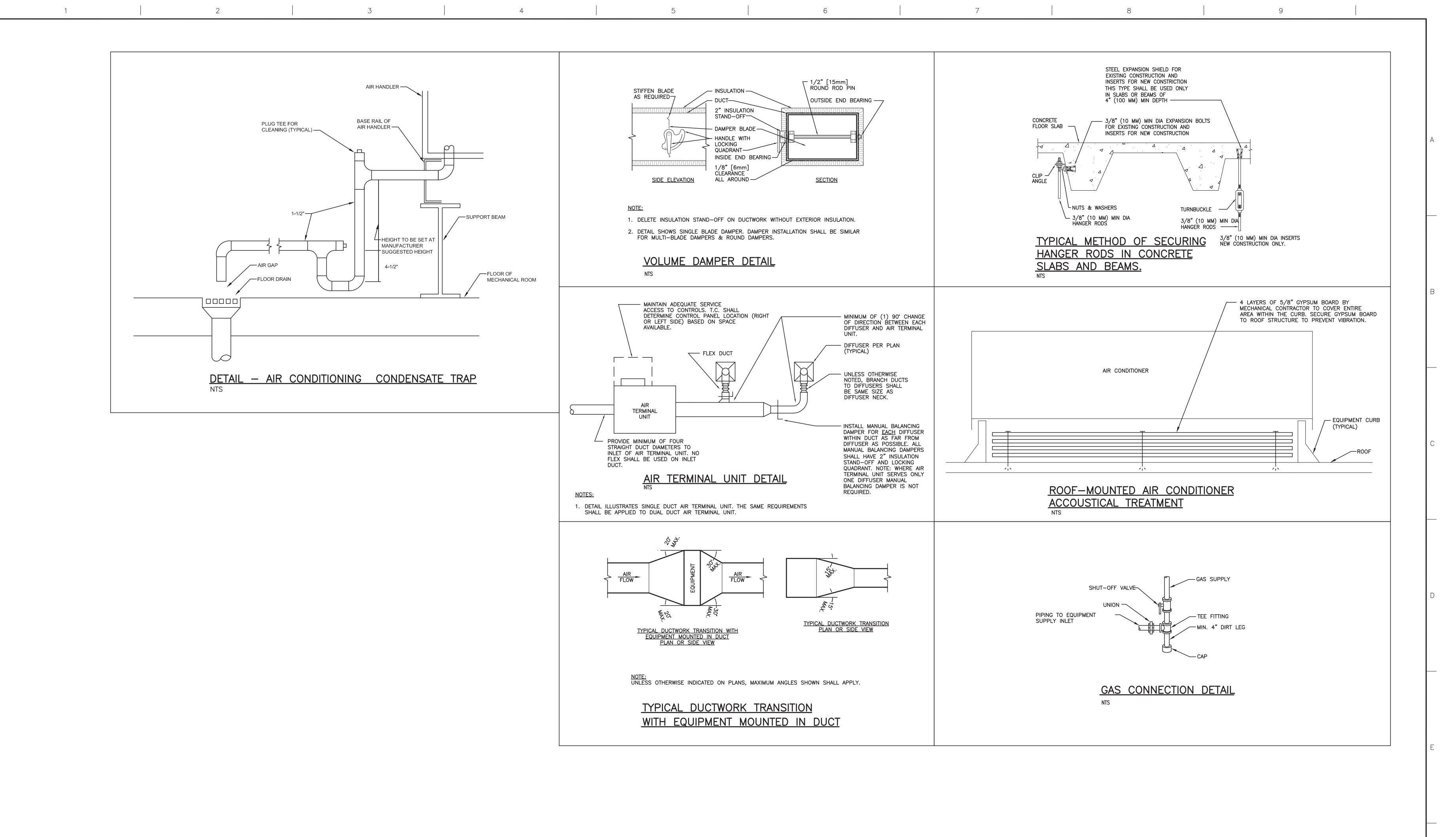
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Checked By Drawn By

Office of Construction and Facilities Management

541-13-106

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## FOR CONSTRUCTION

one eighth inch = one foot

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VA FORM 08-6231

CONSULTANTS: FINAL CD SUBMISSION 03-29-13

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	ARCHITECT/ENGINEERS:
-	FREDRICK, FREDRICK & HELLER ENGINEERS, INC. 672 EAST ROYALTON ROAD BROADVIEW HTS., OHIO 44147 TEL (440) 546–9696 FAX: (440) 546–9699

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Drawing Title  MECHANICAL DETAILS
Approved: Project Director

VAMC UPGRADE LEARNING EXCHANGE - PHASE 2 10701 E. BLVD., CLEVELAND, OHIO 44107

03/29/13

541-13-106 Building Number Drawing Number 1-M2 Checked By Drawn By

Project Number

Construction and Facilities Management

Office of

#### SEQUENCE OF OPERATION FOR ROOFTOP AIR HANDLING UNIT (RTU-1 THRU RTU-4)

- 1. RUN CONDITIONS -
- 1.1 OCCUPIED MODE:
- A. DURING OCCUPIED HOURS (0700 TO 1800)(ADJ) (1) THE UNIT FAN SHALL RUN CONTINUOUSLY. THE UNIT SHALL SEQUENCE HEATING AND
  - COOLING TO MAINTAIN 55° F LEAVING AIR (3) OUTSIDE AIR DAMPER(S) SHALL BE OPERABLE
- (OPEN TO MINIMUM POSITION). (4) ECONOMIZER SHALL BE ABLE TO BE ENABLED.
- 1.2 UNOCCUPIED MODE:
- B. DURING UNOCCUPIED HOURS (1800 TO 0700)(ADJ) (1) THE UNIT FAN SHALL BE OFF, UNLESS ON SPACE CALL FOR HEAT/COOL. (INTERMITTENT OPERATION)
  - (2) ON CALL FOR COOLING: (a) THE UNIT SHALL SEQUENCE UNIT COOLING TO MAINTAIN 55° F LEAVING AIR SETPOINT.
  - (b) ECONOMIZER SHALL BE ABLE TO BE (3) ON CALL FOR HEATING: THE UNIT SHALL SEQUENCE UNIT HEATING TO MAINTAIN 55° F
- LEAVING AIR SETPOINT. (4) OUTSIDE AIR DAMPER(S) SHALL BE CLOSED, UNLESS ECONOMIZER COOLING IS REQUIRED. (5) UNIT VAV BOX OCCUPANCY CONTROLS SHALL BE LOCKED OUT. ALL BOXES SHALL REVERT TO THEIR INDIVIDUAL MINIMUM UNOCCUPIED AIR
- 1.3 SETBACK CONDITIONS:

FLOW RATES.

- A. EACH VAV BOX TEMPERATURE SENSOR SHALL BE ABLE TO MODULATE UNIT COOLING/HEATING DURING UNOCCUPIED MODE. B. USER OVERRIDE: ON USER INPUT TO SPACE TEMPERATURE SENSOR, THE SYSTEM SHALL OPERATE
- 1.4 ALARMS: A. HIGH LEAVING AIR TEMPERATURE B. LOW LEAVING AIR TEMPERATURE C. OPEN OUTSIDE AIR DAMPER DURING UNOCCUPIED

AS OCCUPIED FOR 60 MINUTES (ADJ).

- 2. SMOKE DETECTION
- 2.1 THE UNIT SHALL SHUT DOWN AND GENERATE AN ALARM UPON RECEIVING A SMOKE DETECTOR STATUS. ALL SMOKE DAMPERS SHALL CLOSE.
- SUPPLY FAN
- 3.1 THE SUPPLY FAN SHALL RUN ANYTIME THE UNIT IS COMMANDED TO RUN, UNLESS SHUTDOWN ON SAFETIES.
- 3.2 TO PREVENT SHORT CYCLING, THE SUPPLY FAN SHALL HAVE A USER DEFINABLE (ADJ.) MINIMUM RUNTIME.
- 3.3 THE CONTROLLER SHALL MODULATE THE SUPPLY FAN VFD TO MAINTAIN PRESSURE, 0.75" SP (ADJ), SETPOINT AT SUPPLY AIR PRESSURE SENSOR. THE SENSOR SHALL BE LOCATED 2/3 DOWN THE LONGEST BRANCH.
- 3.4 THE SUPPLY FAN VFD SPEED SHALL NOT DROP BELOW 30% (ADJ).
- 3.5 ALARMS: A. SUPPLY FAN FAILURE B. SUPPLY FAN IN HAND C. SUPPLY FAN RUNTIME EXCEEDED D. HIGH DISCHARGE STATIC (1.75" SP, ADJ).
- 4. COOLING COIL (DX)
- 4.1 THE COOLING SHALL BE STAGED TO MAINTAIN COOLING SETPOINT, DISCHARGE AIR TEMPERATURE OF 55 DEG F

E. LOW DUCT STATIC (0.3" SP, ADJ)

4.2 TO PREVENT SHORT CYCLING, THERE SHALL BE A USER DEFINABLE DELAY BETWEEN STAGES. EACH STAGE SHALL HAVE A USER DEFINABLE MINIMUM RUNTIME.

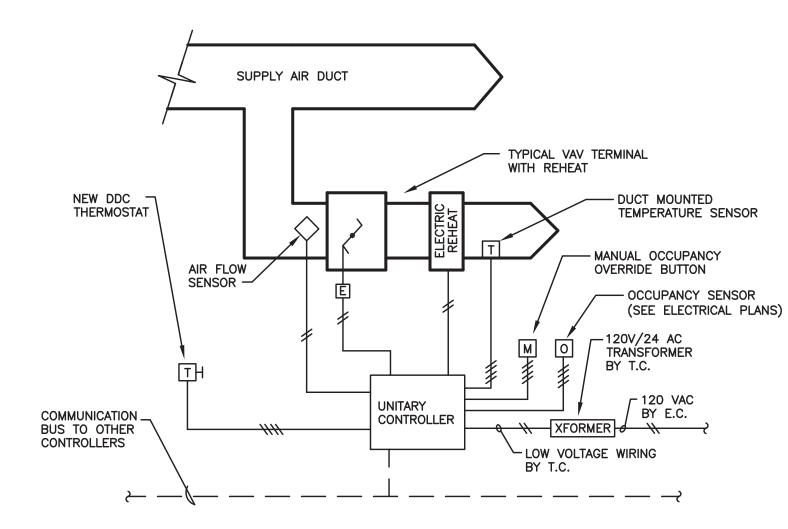
- 4.3 VARIABLE REFRIGERANT COMPROSSESOR(S) SHALL MODULATE TO BEST LOAD MATCH CONNECTED LOAD.
- 4.4 THE COOLING SHALL BE ENABLED WHENEVER ALL THE FOLLOWING ARE TRUE: A. OUTSIDE AIR TEMPERATURE IS GREATER THAN 60 DEG
- THÈ ECONOMIZER IS DISABLED OR FULLY OPEN THE SUPPLY AIR TEMPERATURE IS ABOVE COOLING
- THE SUPPLY FAN STATUS IS ON.

THE HEATING IS NOT ACTIVE.

- 5. HEATING (NATURAL GAS)
  - 5.1 THE HEATING CONTROLS SHALL MODULATE THE NATURAL GAS CONTROL VALVE TO MAINTAIN DISCHARGE AIR
- 5.2 THE HEATING SHALL BE STAGED TO MAINTAIN HEATING SETPOINT. TO PREVENT SHORT CYCLING, THE STAGE SHALL
- HAVE A USER DEFINABLE MINIMUM RUNTIME. 5.2 THE HEATING SHALL BE ENABLED WHENEVER ALL ARE
- A. OUTSIDE AIR TEMPERATURE IS LESS THAN 60 DEG F B. THE DISCHARGE AIR TEMPERATURE IS BELOW HEATING
- SETPOINT. THE SUPPLY FAN STATUS IS ON. D. THE COOLING IS NOT ACTIVE.

#### 6. ECONOMIZER

- 6.1 THE ECONOMIZER DAMPERS SHALL MODULATE TO MAINTAIN A SETPOINT 2 DEG F (ADJ.) LESS THAN THE COOLING SETPOINT. THE OUTSIDE AIR DAMPERS SHALL MAINTAIN A MINIMUM POSITION OPEN WHEN NOT IN ECONOMIZER.
- 6.2 THE ECONOMIZER SHALL BE ENABLED WHENEVER ALL ARE A. OUTSIDE AIR TEMPERATURE IS LESS THAN 65 DEG F
- B. OUTSIDE AIR TEMPERATURE IS LESS THAN RETURN AIR TEMPERATURE. C. SUPPLY FAN STATUS IS ON.
- 6.3 THE ECONOMIZER SHALL CLOSE WHENEVER MIXED AIR TEMPERATURE DROPS TO 40 DEG F (ADJ) OR ON LOSS OF SUPPLY FAN STATUS
- 7.1 OUTSIDE AIR DAMPER SHALL CLOSE AND RETURN AIR DAMPER SHALL BE OPEN WHEN THE UNIT IS OFF.
- 8.1. THE CONTROLLERS SHALL MONITOR FILTER STATUS 8.2. ALARMS A. PREFILTER CHANGE REQUIRED
- 9. DEMAND CONTROL VENTILATION
  - 9.1 DEMAND CONTROL VENTILATION SHALL ONLY BE ACTIVE DURING OCCUPIED MODE AND WHEN ECONOMIZER IS OFF.
  - 9.2 EACH RTU SHALL HAVE A MINIMUM OF THREE (3) CRITICAL ZONES (TO BE FIELD ESTABLISHED).
- 9.3 UNDER NORMAL CONDITIONS, THE OUTSIDE AIR SET POINT SHALL BE SET AT 10% OPEN.
- 9.4 CARBON MONOXIDE SENSORS IN THE RETURN OF EACH
- CRITICAL ZONE SHALL ESTABLISH "OA OVERRIDE MODE".
- 9.5 DURING "OA OVERRIDE MODE": A. OPEN OA DAMPER AN ADDITIONAL 5% (ADJ.) REVIEW CRITICAL ZONE FOR 15 MINUTES (ADJ)
- IF CRITICAL ZONE IS IN CONTINUED ALARM, THAN OPEN OA DAMPER ADDITIONAL 5% (ADJ). D. REPEAT UNTIL ZONE IS NO LONGER IN ALARM OR MAXIMUM OUTSIDE AIR POSITION IS MET (35%).



#### SEQUENCE OF OPERATION FOR VAV BOXES

#### OPERATION (REFER TO VAV SCHEDULE):

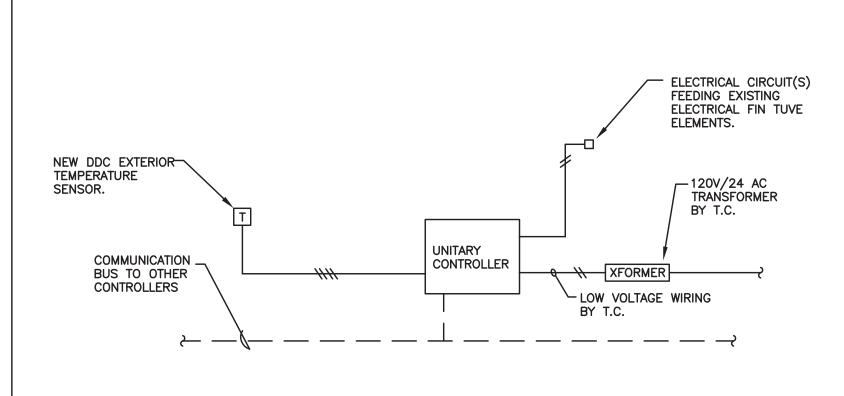
- SPACE THERMOSTAT SHALL MODULATE DAMPER TO MAINTAIN SET POINT. B. ON CALL FOR HEAT, RETURN DAMPER TO MINIMUM POSITION AND MODULATE ELECTRIC RESISTANCE
- HEAT ELEMENT TO MAINTAIN SETPOINT. C. DUCT MOUNTED TEMPERATURE SENSOR SHALL REPORT REHEAT COIL LEAVING AIR TEMPERATURE TO BUILDING AUTOMATION SYSTEM.

#### OCCUPANCY CONTROL (APPLIES TO ALL VAV BOXES):

- OCCUPANCY SHALL BE DETERMINED FROM ELECTRICAL LIGHTING OCCUPANCY SENSOR SYSTEM FOR RESPECTIVE SERVICE AREA. CONTRACTOR SHALL TIE INTO ELECTRICAL OCCUPANCY SENSOR VIA AUXILIARY DRY CONTACTS ON SENSORS. REFER TO ELECTRICAL PLANS FOR ADDITIONAL
- INFORMATION. B. ROOM OVERRIDE SHALL BE POSSIBLE FROM MANUAL OCCUPANCY BUTTON ON TEMPERATURE
- SENSOR. OVERRIDE SHALL BE LIMITED TO 60 MINUTES (ADJ.) C. OCCUPIED: VAV TERMINAL SHALL OPERATE UNDER STANDARD COOLING/HEATING MODES TO
- MAINTAIN ROOM THERMOSTAT SETPOINTS AS LISTED IN ROOM DESIGN SCHEDULE ON DRAWING
- D. UNOCCUPIED: VAV TERMINAL SHALL RESET TO UNOCCUPIED MINIMUM. UNOCCUPIED MINIMUM SHALL BE 50%
- OF OCCUPIED MINIMUM (OCCUPIED MINIMUM IS LISTED MINIMUM AIR FLOW IN VAV SCHEDULE). VAV TERMINAL SHALL OPERATE COOLING/HEATING MODES TO MAINTAIN 'UNOCCUPIED' SPACE THERMOSTAT SETPOINTS:
- 3. UNOCCUPIED SPACE THERMOSTAT SETPOINTS:
- a. HEATING: 68° F (ADJ.) b. COOLING: 78° F (ADJ.)

#### **GENERAL CONTROLS NOTES:**

- A. IN DIAGRAMS, 'I' INDICATES AN INPUT, 'O' INDICATES AN OUTPUT.
- B. DAMPER OPERATORS TO BE PROVIDED BY TEMPERATURE CONTROLS CONTRACTOR.
- C. TEMPERATURE CONTROL TEST SHALL INCLUDE, BUT NOT BE LIMITED TO: DAMPER OPERATION
- VALVE ACTUATION RESPONSE AND VALIDATION OF CORRECT OPERATION VERIFIED ENTIRE CONTROL SEQUENCE OPERATES PER DESIGN ACCOUNT FOR ALL CONTROL POINTS LISTED
- D. ALL SYSTEMS SHALL BE COMMISSIONED. REFER TO SPECIFICATIONS FOR ADDITIONAL
- TEMPERATURE CONTROLS SHALL BE ANDOVER. ALL CONTROLS WORK SHALL INTERFACE WITH EXISTING ANDOVER BUILDING CONTROL SYSTEM.
- TEMPERATURE CONTROL SYSTEM SHALL MONITOR STEAM BTU METER AND REPORT VOLUMETRIC FLOW, TEMPERATURE, PRESSURE, DENSITY, AND MASS FLOW READINGS FROM METER TO BUILDING AUTOMATION SYSTEM.
- G. TEMPERATURE CONTROL SYSTEM SHALL MONITOR THE CHILLED WATER BTU METER AND REPORT BTU RATE, TON RATE, FLOW RATE, FLOW VELOCITY, MASS FLOW, TOTAL BTUS, TOTAL TONS, TOTAL FLOW, SIGNAL STRENGTH, SIGNAL QUALITY, LIQUID SONIC VELOCITY, REYNOLDS REGIME TO BUILDING AUTOMATION SYSTEM.
- H. TEMPERATURE CONTROL SYSTEM SHALL TIE-IN ALARMS AND STATUS FROM SEWAGE EJECTOR PUMP AND STORM WATER SUMP PUMP CONTROL PANELS.
- TEMPERATURE CONTROL SYSTEM SHALL TIE-IN ALARMS FROM ELECTRIC CONDENSATE PUMPS CP-1 AND CP-2.
- BUILDING AUTOMATION SYSTEM SHALL GENERATE AN ALARM ON HIGH LEVEL OR LEAKAGE OF DECONTAMINATION TANK.

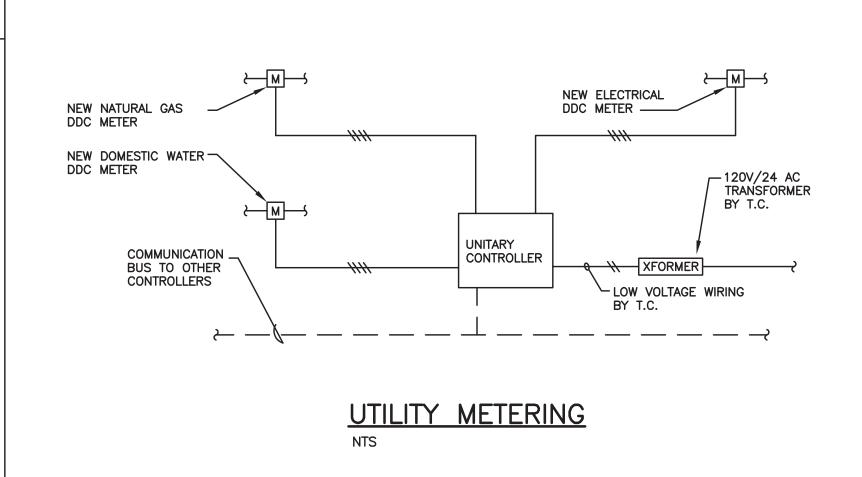


FINNED TUBE RADIATION **CONTROL DIAGRAM** 

#### SEQUENCE OF OPERATION FOR FINNED TUBE RADIATION

**RUN CONDITIONS:** 

A. ELECTRIC BASEBOARD CONTROL SHALL LOCK OUT CONTROL ABOVE 60 DEG F. (ADJ.) B. EXISTING LOCAL CONTROLS SHALL MODULATE THERMOSTAT



CONTROLS MUST BE COMPLIANT WITH NEW VA CONTROLS SYSTEM DEFINED UNDER CONTRACT IN:

PROJECT. NO. 541-10-1014 SPEC SECTION 25-99-99.

# FOR CONSTRUCTION

CONSULTANTS:

12027 03/29/13

ARCHITECT/ENGINEERS: FREDRICK, FREDRICK & HELLER

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Drawing Title HVAC CONTROL DETAILS Approved: Project Director

Project Title Project Number VAMC UPGRADE LEARNING 541-13-106 **EXCHANGE - PHASE 2** Building Number Drawing Number Location 10701 E. BLVD., CLEVELAND, OHIO 44107 Checked By Drawn By

Office of Construction and Facilities Management

VA FORM 08-6231

FINAL CD SUBMISSION

03-29-13

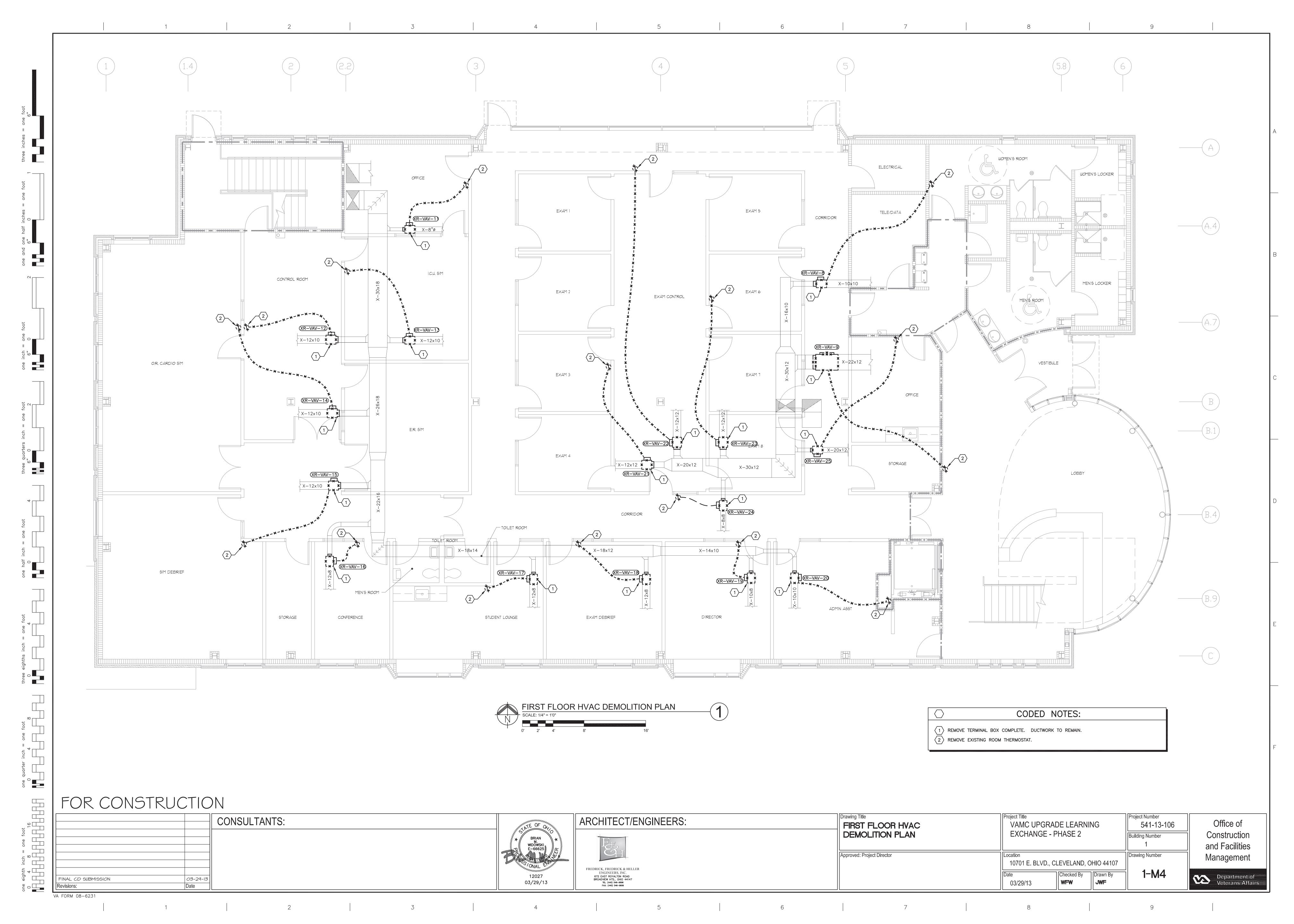
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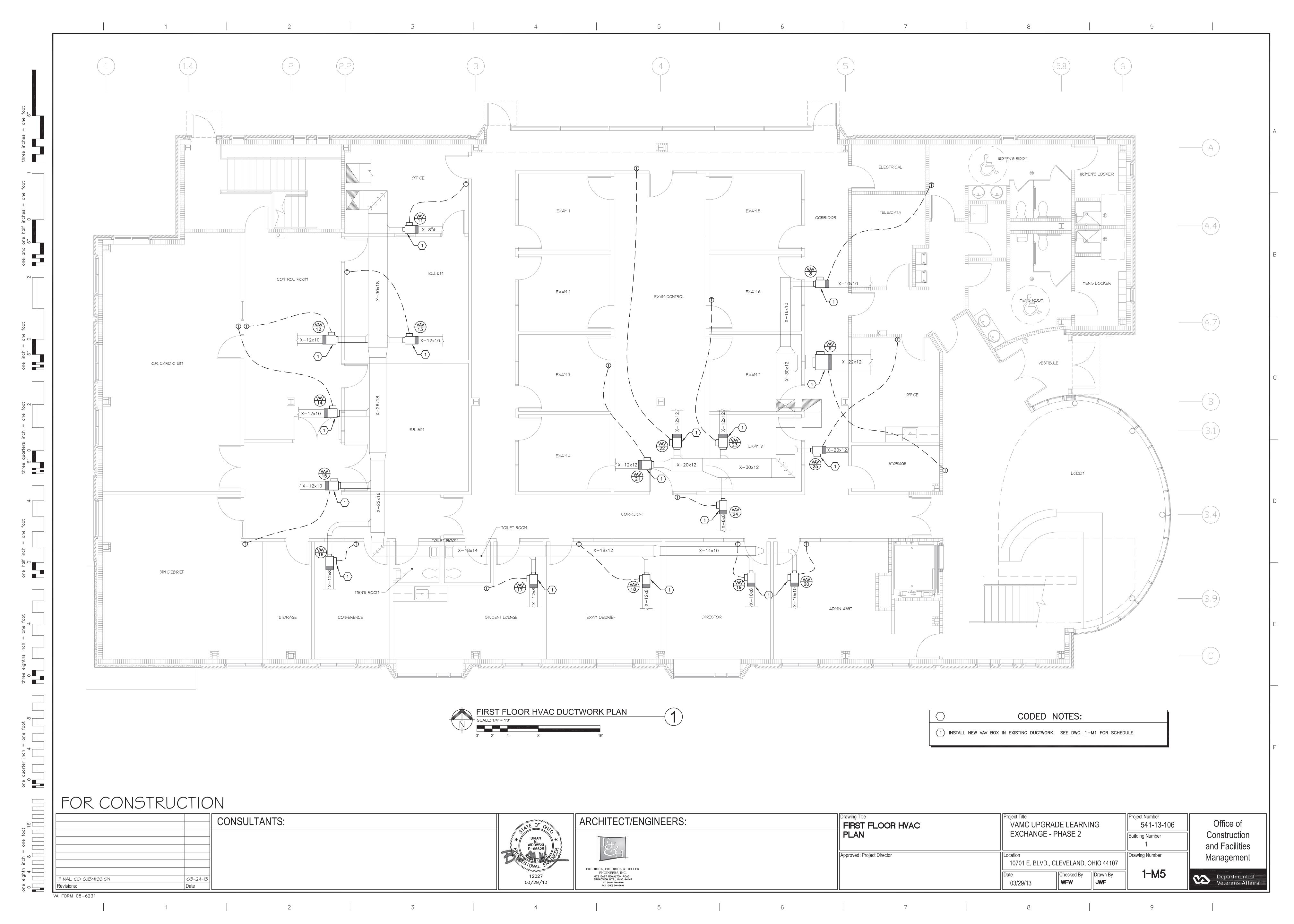
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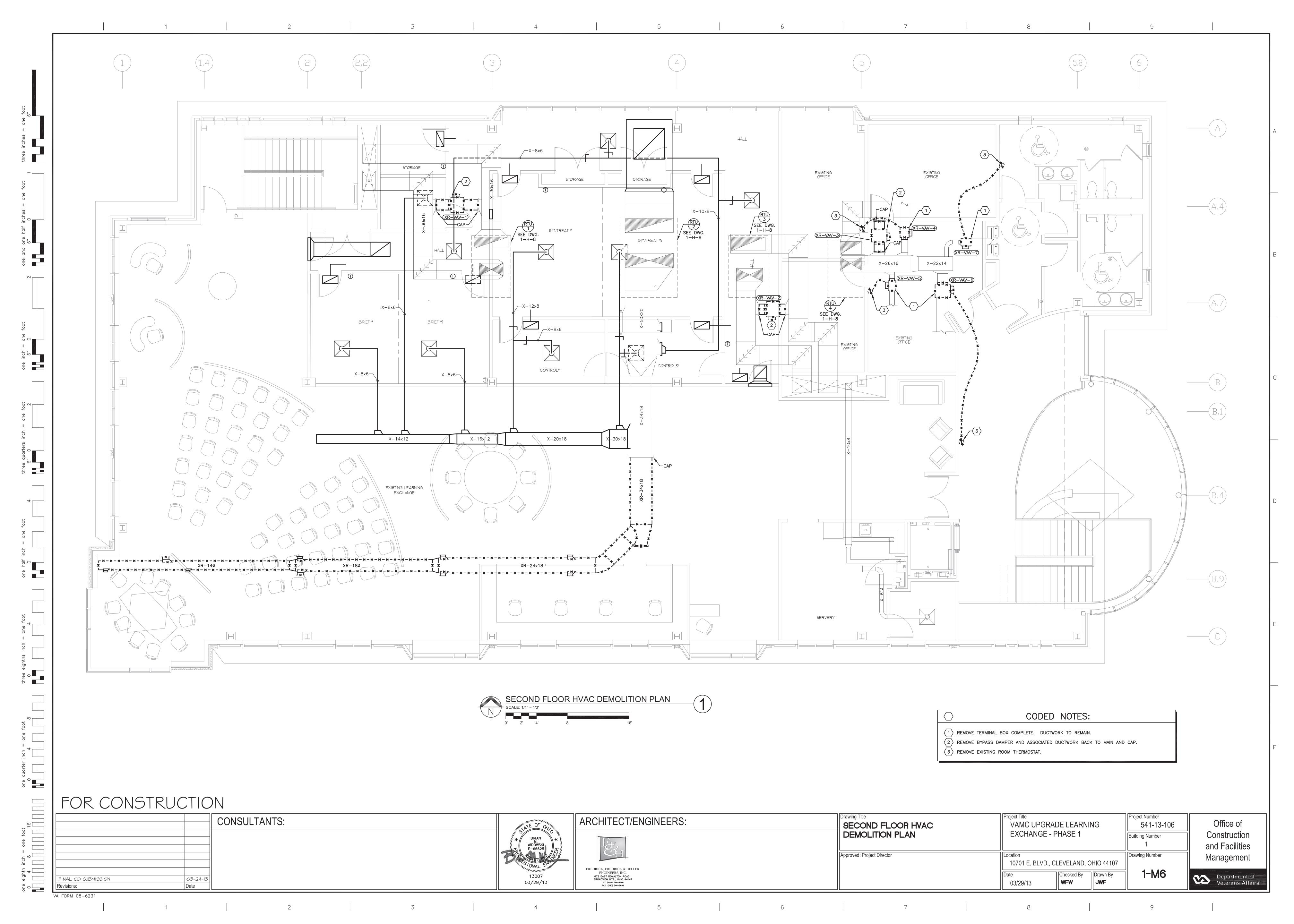
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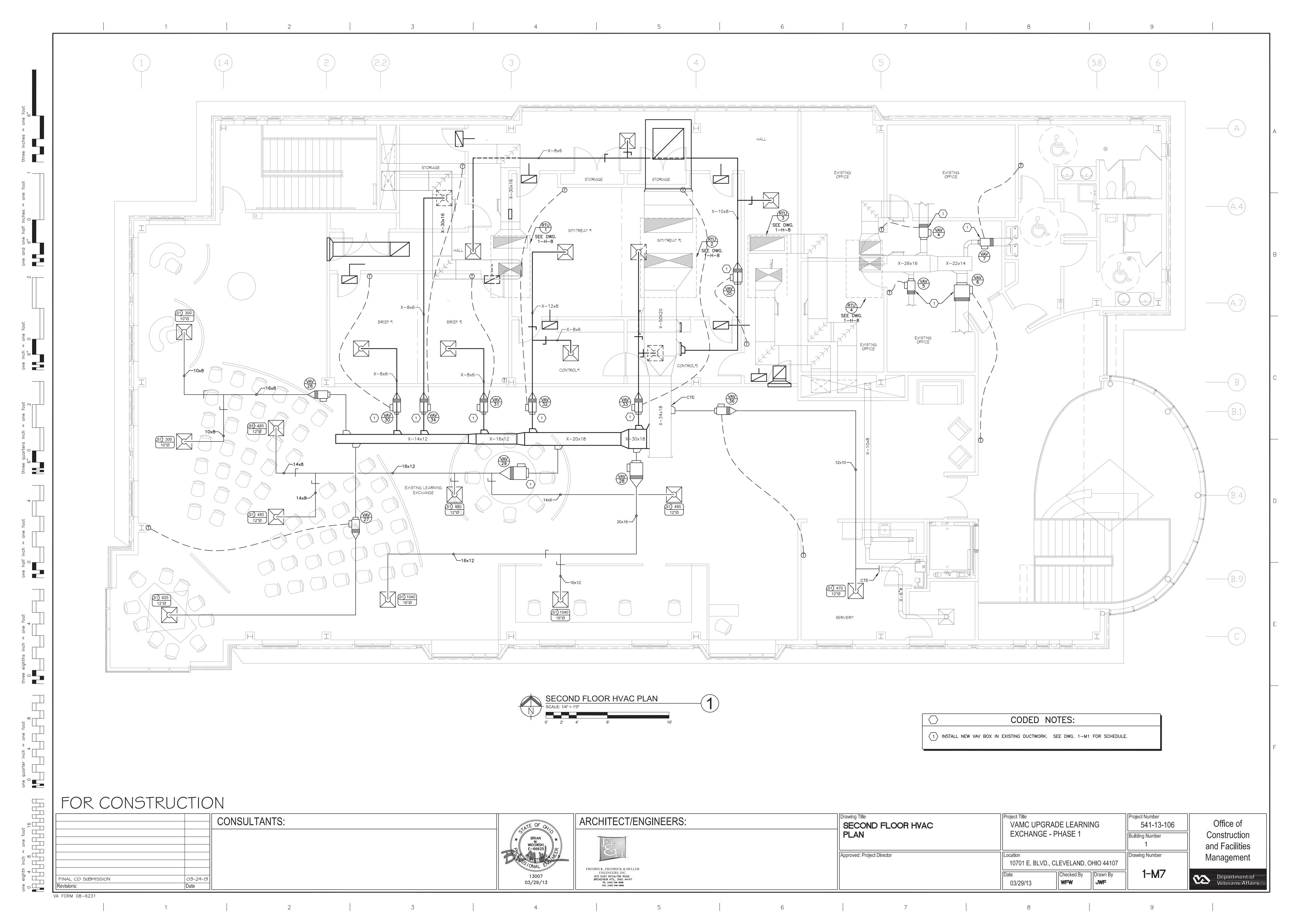
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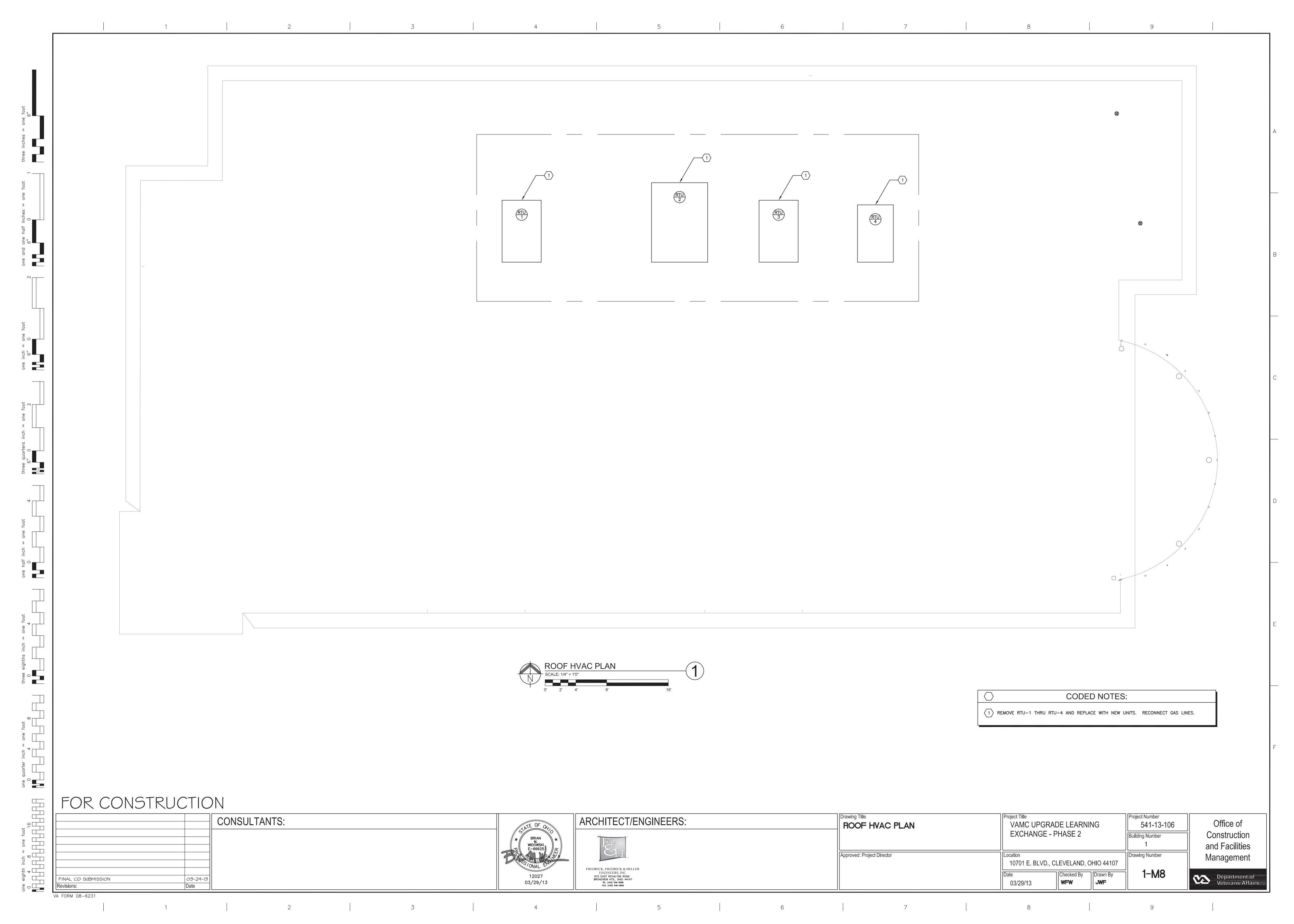
1-M3











#### WIRING DEVICES

- 20A-125V, HOSPITAL GRADE, GROUNDED DUPLEX RECEPTACLE, MOUNT AT 18" AFF UNLESS OTHERWISE NOTED.
- 20A-125V, HOSPITAL GRADE, GROUNDED TAMPER RESISTANT RECEPTACLE, MOUNT AT 18" AFF UNLESS OTHERWISE NOTED.
- DOUBLE 20A-125V, HOSPITAL GRADE, GROUNDED DUPLEX RECEPTACLE, MOUNT AT 18" AFF UNLESS OTHERWISE NOTED.
- 20A-125V, HOSPITAL GRADE, GROUND FAULT INTERRUPTER RECEPTACLE, MOUNT AT 18" AFF UNLESS OTHERWISE NOTED.
- RECESSED METALLIC MULTI-SERVICE FIRE RATED FLOOR BOX, 4" CORE DRILL (SIMILAR TO HUBBELL #S1PTAL SERIES) - INSTALLED IN CONCRETE FLOOR WITH (1)DUPLEX RECEPTACLE AND (1)TELEPHONE/DATA OUTLET -POWER AND COMMUNICATIONS CABLING SHALL BE ROUTED IN SEPARATE 1" CONDUITS. FLOOR BOX SHALL BE FURNISHED WITH HINGED DOORS, FLUSH COVER AND CARPET FLANGE, CONTRACTOR SHALL VERIFY THAT DEPTH OF EXISTING CONCRETE FLOOR THICKNESS MEETS INSTALLATION REQUIREMENTS OF THE FLOOR BOX.

#### FIRE ALARM SYSTEM LEGEND

- FIRE ALARM CONTROL PANEL (EXISTING NOTIFIER AFP-100 SYSTEM).
- FIRE ALARM REMOTE ANNUNCIATOR FLUSH MOUNT AT 5'-0" AFF TO TOP OF DEVICE.
- FIRE ALARM POWER SUPPLY EXTENDER CONNECT TO 120V LIFE SAFETY CIRCUIT. SURFACE MOUNT AT 5'-0" AFF TO TOP OF DEVICE.
- FIRE ALARM TERMINAL CABINET.
- NOTIFICATION APPLIANCE CIRCUIT EXTENDER
- MANUAL FIRE ALARM PULL STATION MOUNT AT 48" AFF TO CENTERLINE OF DEVICE.
- FIRE ALARM AUDIBLE VISUAL SIGNAL DEVICE (ADA TYPE) MOUNTED 80" AFF UNLESS NOTED. WHITE HOUSING WITH RED SUFFIX DENOTES:
  - S SPEAKER D - FLASHING DOME LIGHT C - COMBINATION SPEAKER WITH FLASHING DOME LIGHT
- SMOKE DETECTOR ADDRESSABLE INTELLIGENT PHOTOELECTRIC TYPE CEILING MOUNTED.
- DUCT DETECTOR ADDRESSABLE INTELLIGENT PHOTOELECTRIC DETECTOR, SAMPLING TUBES AND PROGRAMMABLE RELAY BASE. PROVIDE DUCT DETECTOR TEST/RESET SWITCH \$RT WITH REMOTE INDICATOR LAMP FOR EACH DUCT DETECTOR.
  - MAGNETIC TYPE DOOR HOLDER OUTLET. 24VDC
- PNEUMATICALLY ACTUATED COMBINATION SMOKE/FIRE DAMPER FURNISHED AND INSTALLED BY THE MC. EC SHALL PROVIDE (1) CONTROL MODULE AND (1) MONITOR MODULE
- CONTROL MODULE ADDRESSABLE RELAY FOR CONTROL OF SMOKE DAMPERS, ELEVATOR RECALL, MAGNETIC DOOR HOLDERS, AUTOMATIC DOORS, ETC.
- MONITOR MODULE ADDRESSABLE SUPERVISED FOR MONITORING TAMPER SWITCH, FLOW SWITCH, DAMPER
- TAMPER SWITCH MECHANICAL CONTRACTOR SHALL FURNISH AND INSTALL TAMPER SWITCH. ELECTRICAL CONTRACTOR SHALL PROVIDE MONITOR MODULE AND TEST SWITCH.
- FLOW SWITCH MECHANICAL CONTRACTOR SHALL FURNISH AND INSTALL FLOW SWITCH. ELECTRICAL CONTRACTOR SHALL PROVIDE MONITOR MODULE AND TEST SWITCH.

#### FIRE ALARM SYSTEM NOTES:

PROVIDE A 2-GANG MINIMUM SIZE BACKBOX FOR ALL OF THE ABOVE FIRE ALARM DEVICES. ALL FIRE ALARM SYSTEM CONDUCTORS SHALL BE INSTALLED IN 3/4" MINIMUM SIZE COMPLETE CONDUIT SYSTEM WITH COLOR CODED WIRING AS INDICATED ON SHOP DRAWINGS - MAINTAIN BUILDING COLOR CODING. ALL NETWORK AND NETWORK CABLES SHALL BE "COMMUNICATION GRADE" TYPE CABLE. FURNISH, INSTALL AND CONNECT ALL FIRE ALARM DEVICES IN ACCORDANCE WITH WIRING DIAGRAMS PREPARED BY SYSTEM VENDOR. EXISTING FIRE ALARM SYSTEM BY NOTIFIER. REFER TO SPECIFICATIONS SECTION 283100 FOR ELECTRICAL REQUIREMENTS.

#### WIRING TERMINATIONS

- JUNCTION BOX, CEILING OR WALL MOUNTED, 4" SQ. WITH GROUND LUG, UNLESS OTHERWISE NOTED. COORDINATE MOUNTING LOCATION WITH EQUIPMENT. SC - SINK STATION CONTROLS. CONNECT PER MANUFACTURES WIRING DIAGRAM. CP - MECHANICAL EQUIPMENT CONTROL PANEL. CONNECT PER MANUFACTURES WIRING DIAGRAM.
- JUNCTION BOX, ABOVE CEILING FOR CONNECTION TO 120V AUTOMATIC DOOR. ELECTRICAL CONTRACTOR SHALL CONNECT AUTOMATIC DOOR INCLUDING PUSH PAD OPERATORS PER MANUFACTURER'S INSTRUCTIONS TO 120V EMERGENCY LIFE SAFETY CIRCUIT. GENERAL CONTRACTOR SHALL FURNISH AND INSTALL AUTOMATIC DOOR.
- JUNCTION BOX MOUNTED AT 48" AFF FOR CONNECTION TO AUTOMATIC DOOR PUSH PAD DEVICE. PROVIDE 3/4"C TO DOOR CONTROLLER WITH WIRING PER MANUFACTURER'S REQUIREMENTS
- MOTOR NUMBER DENOTES HORSEPOWER
- TEMPERATURE CONTROL PANEL FURNISHED AND INSTALLED BY OTHERS. EC SHALL PROVIDE 120V CONNECTION (HARDWIRED OR RECEPTACLE, AS REQUIRED).
- EC SHALL PROVIDE 20A-120V CIRCUIT IN ABOVE FINISHED CEILING MOUNTED JUNCTION BOX FOR VAV TERMINALS. CONNECT ALL VAV'S IN AREA TO CIRCUIT INDICATED. MC SHALL PROVIDE CONTROL TRANSFORMER AND CONTROL WIRING FOR 24VAC VAV TERMINALS. VERIFY LOCATION OF ALL ADJACENT VAV'S WITH MECHANICAL DRAWINGS.

3

MEDICAL GAS ALARM PANEL - CONNECT TO 20A, 120V LIFE SAFETY CIRCUIT, WALL MOUNTED, COORDINATE MOUNTING HEIGHT WITH MC.

#### LIGHTING FIXTURES

- FLUORESCENT LIGHTING FIXTURE CONNECTED TO NORMAL CIRCUIT AS INDICATED TYPE AS SPECIFIED IN SCHEDULE. "A" INDICATES TYPE, "3" INDICATES CIRCUIT NUMBER ASSIGNMENT, "a" INDICATES LOCAL SWITCHING CONTROL. CONNECT FIXTURES SO THAT ALL LAMPS ARE CONTROLLED BY \$0
- LED OR COMPACT FLUORESCENT LIGHTING FIXTURE, CONNECTED TO NORMAL CIRCUIT TYPE AS SPECIFIED IN
- LED OR COMPACT FLUORESCENT LIGHTING FIXTURE, CONNECT TO EMERGENCY CIRCUIT TYPE AS SPECIFIED IN
- EXIT SIGN CONNECT TO CIRCUIT AHEAD OF LOCAL SWITCHING. TYPE AS SPECIFIED IN SCHEDULE.
  - EMERGENCY BATTERY LIGHTING FIXTURE CONNECT TO CIRCUIT AHEAD OF LOCAL SWITCHING. TYPE AS SPECIFIED IN

#### LIGHTING CONTROLS

- 20A-1P-120/277V WALL SWITCH MOUNTED AT 48" AFF UNLESS OTHERWISE NOTED
- \$3 20A-3WAY-120/277V WALL SWITCH MOUNTED AT 48" AFF UNLESS OTHERWISE NOTED.
- OCCUPANCY/VACANCY SENSOR PROVIDE COMPLETE OCCUPANCY SENSOR SYSTEM INCLUDING SENSOR, POWER SUPPLY AND RELAY UNIT. REFER TO "OCCUPANCY SENSOR PROGRAM SCHEDULE" AND "OCCUPANCY SENSOR SYSTEM SPECIFICATIONS" FOR ADDITIONAL INFORMATION.

#### SENSOR DESIGNATIONS U - ULTRASONIC TYPE SENSOR

R - INFRARED TYPE SENSOR D - DUAL TECHNOLOGY TYPE SENSOR

# - PROVIDE RELAY WITH NORMALLY OPEN (N.O.) CONTACT(S), # DENOTES THE QUANTITY OF N.O. RELAYS. IF BLANK, PROVIDE (1) N.O. RELAYS.

H - PROVIDE FORM C RELAY IN RELAY UNIT FOR HVAC SWITCHING

S - "SPECIAL COVERAGE", TWO SIDED, 90 LINEAR FT. COVERAGE

#### EXAMPLES:

- ULTRASONIC SENSOR WITH (2) N.O. CONTACTS
- DH DUAL TECHNOLOGY SENSOR WITH (1) N.O. CONTACT AND (1) FORM C RELAY

#### LIGHTING CONTROLS SYSTEM GENERAL NOTES:

- 1. ALL COMPONENTS FOR OCCUPANCY AND DAYLIGHT HARVESTING SYSTEM SHALL BE FROM A SINGLE MANUFACTURER AND UL LABELED.
- 2. SENSORS (OCCUPANCY/VACANCY, DAYLIGHT HARVESTING, ETC.) MAY BE STAND ALONE, COMBINATION, OR INTEGRATED WITH LIGHTING
- PROVIDE ALL ADDITIONAL COMPONENTS NECESSARY FOR COMPLETE SYSTEM PER MANUFACTURER'S REQUIREMENTS.
- 4. SUBMIT WIRING DIAGRAMS SHOWING COMPLETE LIGHTING CONTROLS CONNECTIONS TO ENGINEER FOR REVIEW WITH SHOP DRAWINGS.

#### MOTOR AND MOTOR CONTROLLERS (FLOOR PLAN VIEW)

- COMBINATION FUSED MAGNETIC MOTOR STARTER COMPLETE WITH "HAND-OFF-AUTO" SELECTOR SWITCH AND RED "RUN" PILOT LIGHT IN COVER. NEMA SIZE O CONTACTS AND NEMA 1 ENCLOSURE MINIMUM UNLESS OTHERWISE NOTED.
- VARIABLE SPEED MOTOR CONTROLLER (REFER TO SPECIFICATIONS SECTION 262911).
- 120V-10 OR 277V-10 (AS REQUIRED) MANUAL MOTOR STARTER WITH INTEGRAL OVERLOAD PROTECTION
- 120V-10 OR 277V-10 (AS REQUIRED) MOTOR STARTER COMPLETE WITH INTEGRAL OVERLOAD PROTECTION AND "HAND-OFF-AUTO" SELECTOR SWITCH.
- 120V-10 OR 277V-10 (AS REQUIRED) LOCKABLE MANUAL SWITCH (NO THERMAL OVERLOADS).
- CONTROLLER FURNISHED WITH EQUIPMENT.

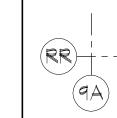
#### **GENERAL LEGEND**

- CODED NOTE "1" INDICATES NOTE NUMBER.
- 1-SF MECHANICAL EQUIPMENT IDENTIFIER



DETAIL REFERENCE - "1" INDICATES DETAIL NUMBER, "1-E01" INDICATED DRAWINGS NUMBER.

5 6



COLUMN GRID

#### LIGHTING FIXTURE SCHEDULE BALLAST/DRIVER INFORMATION LAMP INFORMATION MANUFACTURER/ DESCRIPTION LOCATION MOUNTING TYPE COLOR TEMP. QUANTITY TYPE VOLTAGE NOTES QUANTITY | WATTS EXIT SIGN — LED TYPE, SEALED LEAD CALCIUM BATTERY, SINGLE OR DOUBLE FACE, UNIVERSAL MOUNTING, DIE CAST ALUMINUM HOUSING WITH WHITE BODY, WHITE FACE AND 120-277V VARIOUS LESS THAN RED STENCIL LETTERS. CONNECT TO EMERGENCY LIFE SAFETY CIRCUIT AHEAD OF LOCAL SWITCHING. UL 924 LISTED, UL DAMP LOCATION, UL LISTED FOR 2C. EXIT SIGN WITH EMERGENCY BATTERY LIGHTING UNIT - LED TYPE, SEALED LEAD CALCIUM LESS THAN BATTERY, SINGLE OR DOUBLE FACE, UNIVERSAL MOUNTING, DIE CAST ALUMINUM HOUSING 120-277V VARIOUS WITH WHITE BODY, WHITE FACE AND RED STENCIL LETTERS. CONNECT TO EMERGENCY LIFE SAFETY CIRCUIT AHEAD OF LOCAL SWITCHING. UL 924 LISTED, UL DAMP LOCATION, UL 12W PAR26 LISTED FOR 2C. EMERGENCY BATTERY LIGHTING UNIT - SEALED LEAD CALCIUM BATTERY, HIGH-IMPACT POLYCARBONATE HOUSING, SELF-DIAGNOSTIC CIRCUITRY, PUSHBUTTON TEST SWITCH/POWER 120-277V PAR26 12W INDICATOR LIGHT. CONNECT <u>AHEAD</u> OF LOCAL SWITCHING (UNSWITCHED "HOT" LIGHTING CIRCUIT). WALL MOUNT AT 90" ABOVE FINISHED FLOOR UNLESS OTHERWISE NOTED.

#### GENERAL ELECTRICAL INSTALLATION NOTES:

- 1. ALL MOUNTING HEIGHTS ARE TO CENTER OF DEVICE UNLESS OTHERWISE NOTED.
- ALL NEW WALL MOUNTED ELECTRICAL DEVICES ARE TO BE INSTALLED FLUSH IN WALL UNLESS OTHERWISE NOTED. ALL ELECTRICAL CONDUIT SHALL BE CONCEALED BEHIND FINISHED WALLS AND ABOVE FINISHED CEILING UNLESS OTHERWISE NOTED. THE COST TO CUT AND PATCH WALLS SHALL BE THE RESPONSIBILITY OF THE TRADE REQUIRING THE CUTTING.
- CONTRACTOR IS RESPONSIBLE FOR REMOVAL AND REPLACEMENT OF CEILINGS REQUIRED FOR ELECTRICAL WORK. CONTRACTOR SHALL REPLACE ANY DAMAGED CEILING TILES.
- PRIOR TO INSTALLATION, VERIFY PRECISE LOCATION OF NEW OR RELOCATED WALL OR CEILING MOUNTED DEVICES WITH ARCHITECTURAL ELEVATIONS AND REFLECTED CEILING PLANS.
- COORDINATE ALL SHUT-DOWNS OF EXISTING ELECTRICAL SYSTEMS WITH OWNER A MINIMUM OF FOURTEEN (14) WORKING DAYS IN ADVANCE. ALL SHUT-DOWNS SHALL OCCUR DURING WEEKENDS OR BETWEEN 8:00PM AND 7:00AM ON WEEKDAYS ("OFF-HOURS").
- INCLUDE ALL PREMIUM TIME CHARGES IN BID. ALL NOISE GENERATING OPERATIONS, INCLUDING CUTTING OF CEILINGS, WALLS AND FLOORS, CORING, DRILLING, ETC. SHALL BE
- CONTRACTOR SHALL CONNECT ALL MECHANICAL EQUIPMENT COMPLETE PER MANUFACTURER'S WIRING DIAGRAMS AND INSTRUCTIONS.

SCHEDULED DURING WEEKENDS OR BETWEEN 8:00PM AND 7:00AM ON WEEKDAYS ("OFF-HOURS"). INCLUDE ALL PREMIUM TIME CHARGES

- COORDINATE WITH MECHANICAL CONTRACTOR AND VERIFY LOCATION, VOLTAGE, AMPS, NO. OF WIRES, AND PROTECTION REQUIREMENTS PRIOR TO ROUGH-IN. CONTACT ENGINEER WITH ANY DISCREPANCIES FROM DESIGN DRAWINGS.
- 8. PROVIDE LIQUID-TIGHT FLEXIBLE METAL CONDUIT FOR FINAL CONNECTION TO MECHANICAL EQUIPMENT OR OTHER EQUIPMENT WHICH MAY PROPAGATE VIBRATION.

9. ALL FLUORESCENT LAMPS THAT WILL NOT BE REUSED SHALL BE DISPOSED OF IN ACCORDANCE WITH EPA STANDARDS, AND WRITTEN

- EVIDENCE OF PROPER DISPOSAL SHALL BE FURNISHED TO THE OWNER. 10. ALL WORK SHALL BE PERFORMED IN STRICT CONFORMANCE WITH THE PHASING REQUIREMENTS OF THE PROJECT. ALL COSTS
- ASSOCIATED WITH THESE REQUIREMENTS SHALL BE INCLUDED IN THE BID SUBMITTAL.
- 11. CONTRACTOR IS RESPONSIBLE FOR PROVIDING TEMPORARY LIGHTING TO ADEQUATELY LIGHT ALL CONSTRUCTION AREAS, TEMPORARILY PARTITIONED AREAS, AND EXIT CORRIDORS MAINTAINED DURING CONSTRUCTION.
- 12. <u>DEFINITION:</u> "PROVIDE" FURNISH, INSTALL AND CONNECT COMPLETE.
- 13. PROJECT AND PHASING SCOPE LINES INDICATE WHERE GENERAL CONSTRUCTION BOUNDERIES OCCUR. ELECTRICAL WORK AND UTILITY TIE-INS MAY OCCUR OUTSIDE OF SCOPE LINES.

AUTOMATIC TRANSFER SWITCH

EQUIPMENT GROUND

MAIN CIRCUIT BREAKER

SURFACE MOUNTED

NATIONAL ELECTRICAL CODE

ELECTRIC WATER COOLER

GROUND FAULT CIRCUIT INTERRUPTER

INFORMATION RESOURCES MANAGEMENT

TEMPERATURE CONTROLS CONTRACTOR

CONTRACTING OFFICER/TECHICAL REPRESENTATIVE

#### **ABBREVIATIONS**

- ABOVE COUNTER AT 9" UNLESS OTHERWISE NOTED ABOVE FINISHED CEILING AFC
- ABOVE FINISHED FLOOR
- СМ CEILING MOUNTED
- ELECTRICAL CONTRACTOR
- EOL END OF LINE
- GENERAL CONTRACTOR
- ISOLATED GROUND
- MECHANICAL CONTRACTOR
- MAIN LUGS ONLY
- NOT FUSED
- TELECOMMUNICATIONS CONTRACTOR
  - VARIABLE SPEED MOTOR CONTROLLER WEATHERPROOF ENCLOSURE - NEMA 4 TYPE
- EXISTING OUTLET, DEVICE, LIGHTING FIXTURE, CONDUIT, ETC. TO REMAIN INDICATES EXISTING OUTLET, LIGHTING FIXTURE, CONDUIT, ETC - TO BE REMOVED. PROVIDE BLANK COVER FOR OUTLET AND
- MAINTAIN CIRCUIT CONTINUITY. NEW LOCATION OF EXISTING OUTLET, DEVICE, LIGHTING FIXTURE, ETC.
- EXISTING OUTLET, DEVICE, LIGHTING FIXTURE, ETC. TO BE REPLACED WITH NEW OF SPECIFIED TYPE
- EXISTING OUTLET, DEVICE, LIGHTING FIXTURE, CONDUIT, ETC. TO BE REMOVED COMPLETE- MAINTAIN CIRCUIT CONTINUITY TO ADJACENT OUTLETS, EXTEND CONDUIT AND WIRING AS REQUIRED.
- EXISTING OUTLET, DEVICE, LIGHTING FIXTURE, ETC. TO BE REMOVED AND REINSTALLED AT NEW LOCATION EXTEND
- CONDUIT AND WIRING AS REQUIRED VETERANS AFFAIRS MEDICAL CENTER

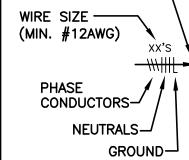
#### POWER DISTRIBUTION EQUIPMENT (FLOOR PLAN VIEW)

- 208/120V-3Ø-4W PANELBOARD UNLESS OTHERWISE NOTED. MOUNT AT 78" AFF TO TOP OF PANEL.
- 480/277V-3Ø-4W PANELBOARD UNLESS OTHERWISE NOTED. MOUNT AT 78" AFF TO TOP OF PANEL.

GENERAL PURPOSE, 3 PHASE DRY-TYPE TRANSFORMER - TYPE AS NOTED ON PLANS.

- FUSED DISCONNECT SWITCH SIZE AND TYPE AS NOTED. PROVIDE CLASS RK1 FUSES UNLESS OTHERWISE NOTED. NEMA 1 ENCLOSURE UNLESS OTHERWISE NOTED.
- GROUNDING BUSBAR

#### **BRANCH CIRCUIT WIRING**



NO. OF CCTS —

IN CONDUIT

GROUND, SEPARATE NEUTRALS (SHARED NEUTRALS ARE NOT PERMITTED FOR BRANCH CIRCUITS) AND THREE HOT LEGS (A DIFFERENT PHASE FOR EACH CIRCUIT) MAXIMUM THREE CIRCUITS PER CONDUIT. 3/4" MINIMUM CONDUIT WITH WIRE SIZE INDICATED ON DRAWING ("XX" INDICATES AWG SIZE). ALL POWER WIRING SHALL BE STRANDED COPPER CONDUCTORS WITH THHN/THWN INSULATION. PROVIDE SEPARATE EQUIPMENT GROUNDING CONDUCTOR (SAME SIZE AS PHASE AND NEUTRAL, UNLESS OTHERWISE NOTED) FOR EACH CONDUIT. CONDUIT WIRE FILLS SHALL BE IN ACCORDANCE WITH LATEST NATIONAL ELECTRIC CODE.

BRANCH CIRCUIT HOME RUN TO PANEL - ARROWHEADS INDICATE CIRCUITS. WIRE INDICATED ARE GREEN

O CONDUIT UP

CONDUIT DOWN

## FOR CONSTRUCTION

CONSULTANTS:

03-29-13

Date

03/29/13

ARCHITECT/ENGINEERS:



FREDRICK, FREDRICK & HELLEI ENGINEERS, INC. 672 EAST ROYALTON ROAD BROADVIEW HTS., OHIO 44147 TEL (440) 546-9696 FAX: (440) 546-9699

**ELECTRICAL LEGEND** Approved: Project Director

7

**EXCHANGE - PHASE 2** 10701 E. BLVD., CLEVELAND, OHIO 44107

03/29/13

VAMC UPGRADE LEARNING

Checked By Drawn By

JDM

**JDM** 

Construction **Building Number** and Facilities Drawing Number Management

roject Number

541-13-106

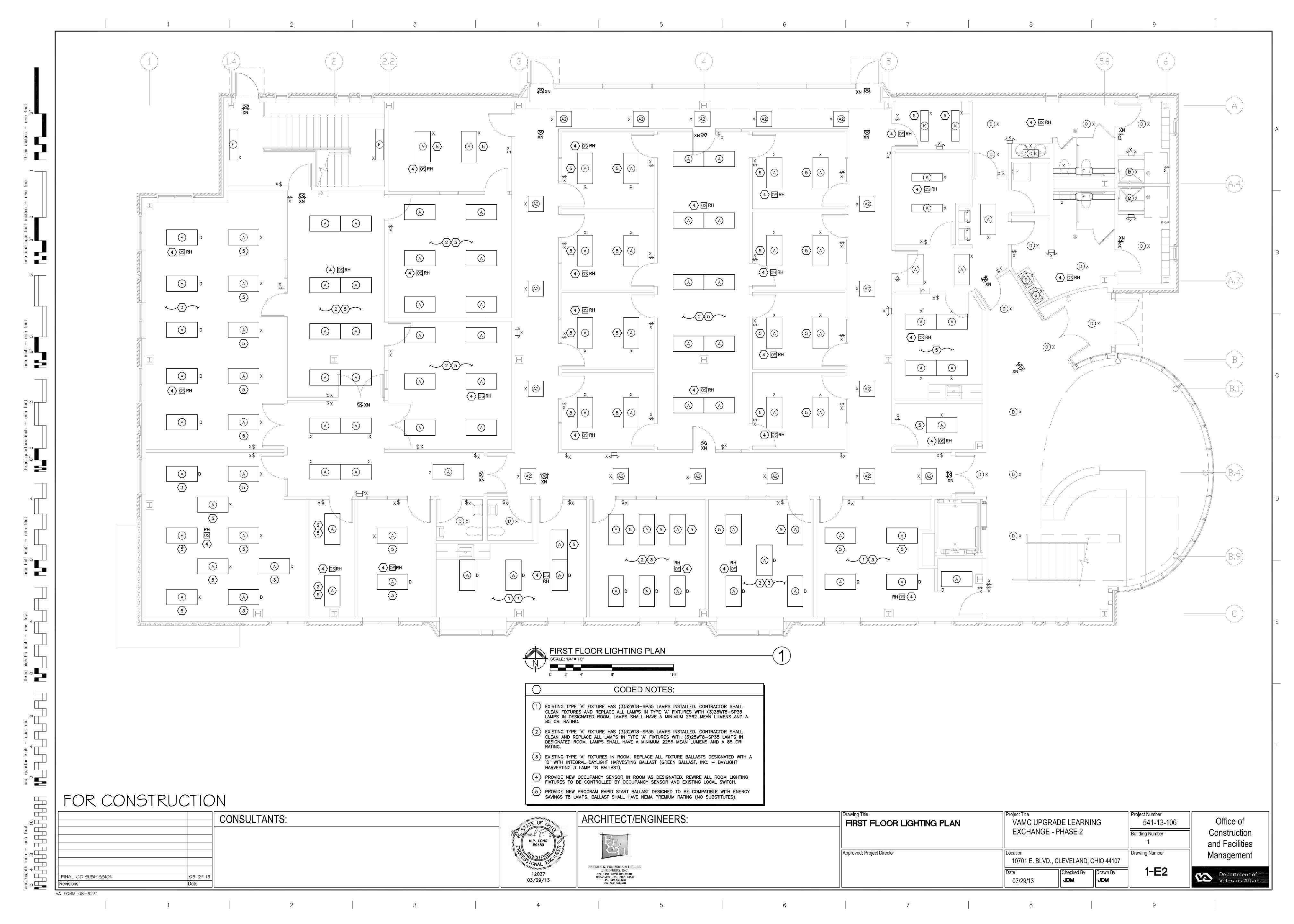
Department of Veterans Affairs

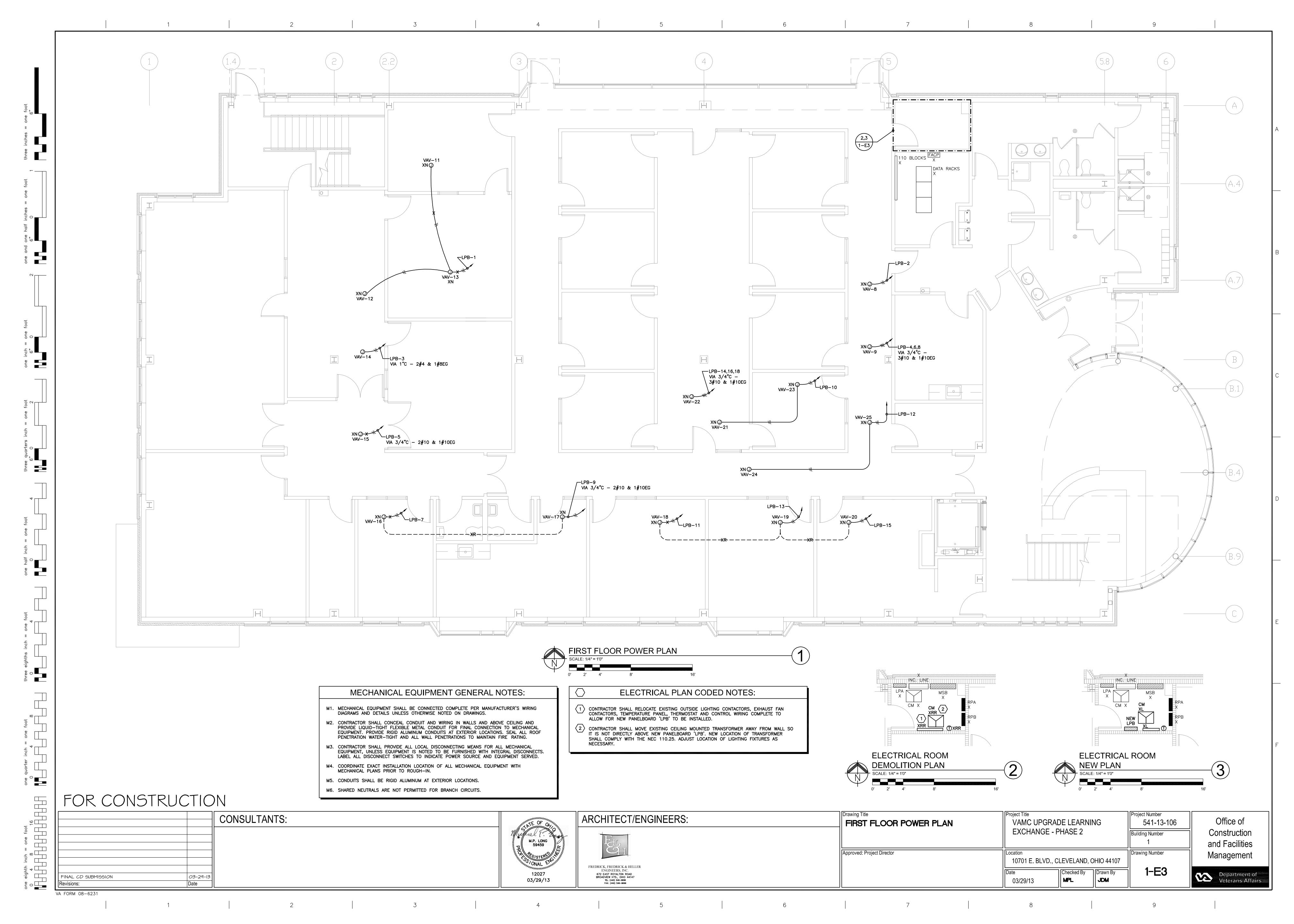
Office of

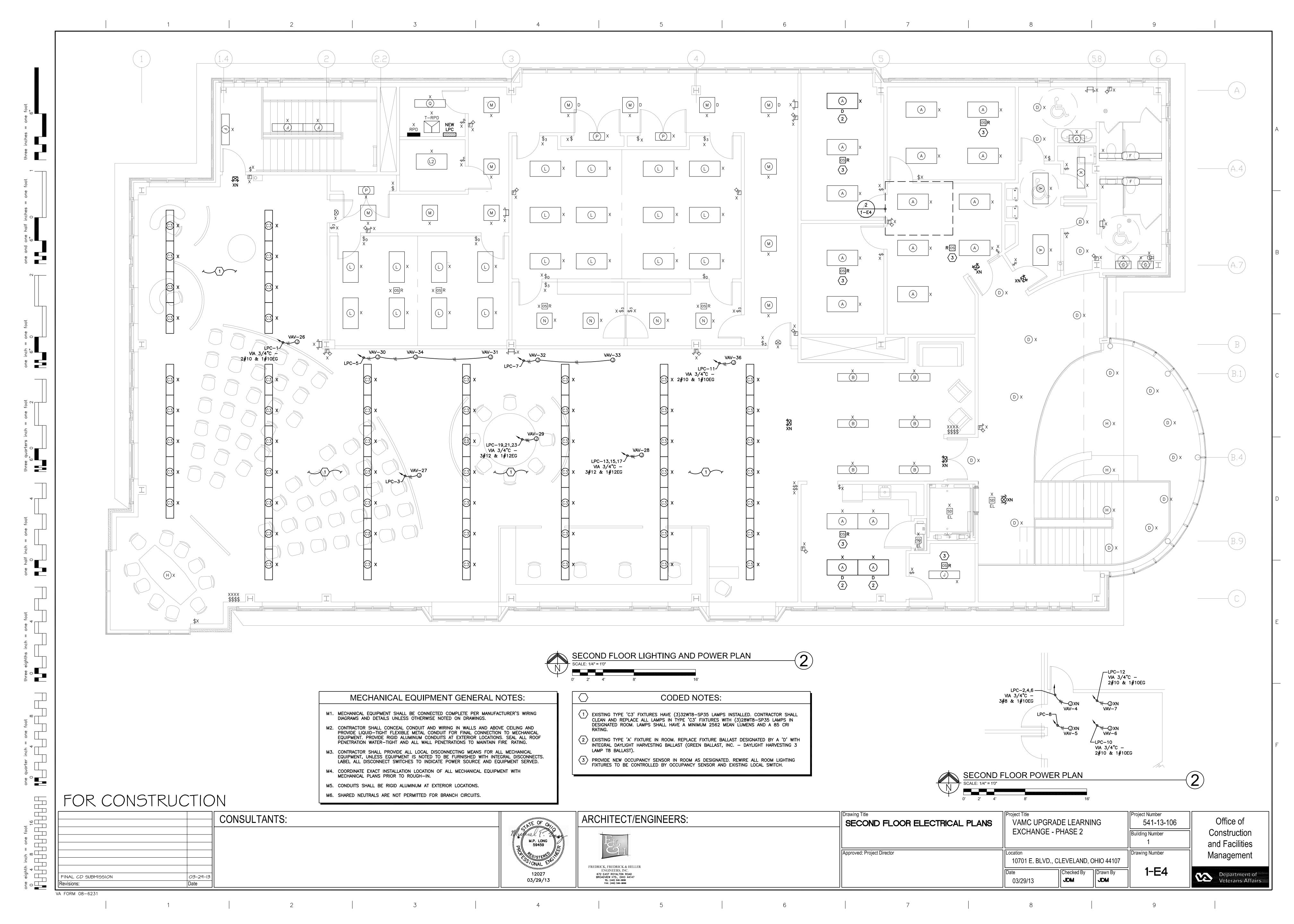
Revisions:

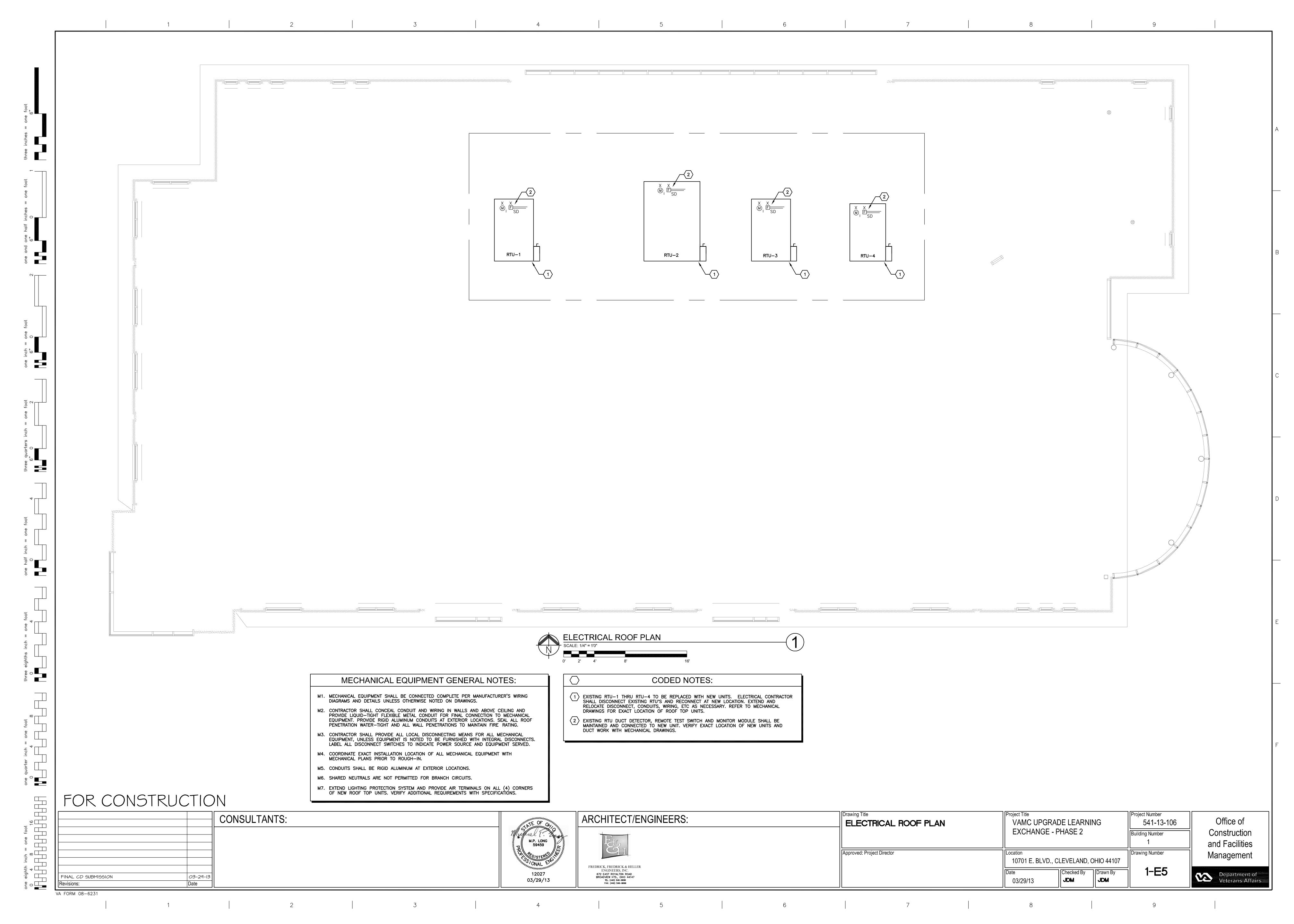
VA FORM 08-6231

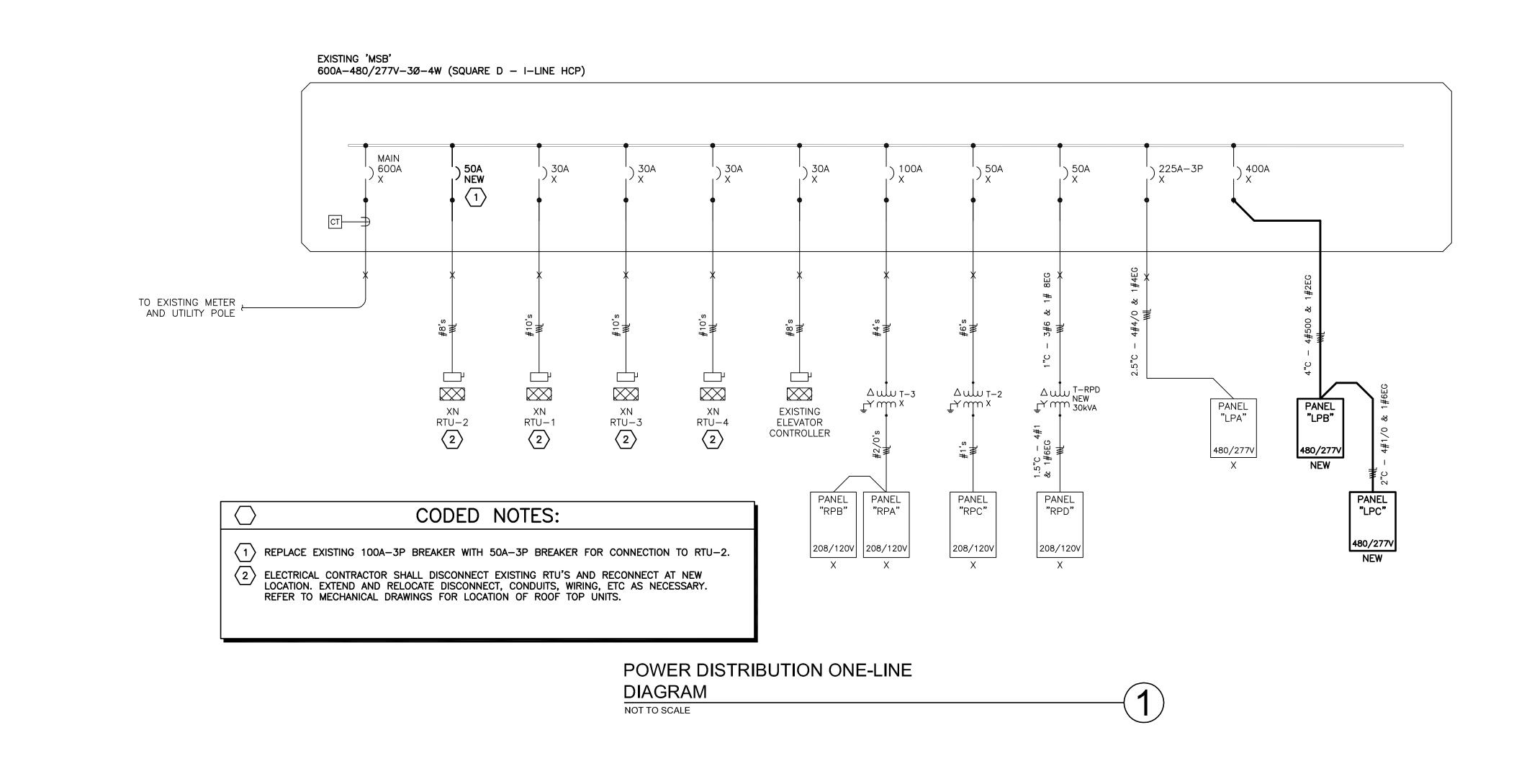
FINAL CD SUBMISSION











PANEL: LOCATION: MOUNTING: COMMENTS:	LPB - 480/277\ FIRST FLOOR ELECTRICA SURFACE NEW PANELBOARD		4W			OCP: MAIN:	400A MLO	NORMAL
KVA:	DESCRIPTION:	CB:	CCT:	N •	CCT:	<u>CB:</u>	DESCRIPTION:	KVA:
3.00	VAV-11, 12, 13	20/1	1	+	_ 2	20/1	VAV-8	4.00
8.00	VAV-14	40/1	3	14	4			6.00
5.00	VAV-15	25/1	5	144	6	30/3	VAV-9	6.00
3.00	VAV-16	20/1	7	1+1-	8			6.00
5.00	VAV-17	25/1	9	14	10	20/1	VAV-21, 23	4.00
3.00	VAV-18	20/1	11	144	12	20/1	VAV-24, 25	2.00
4.00	VAV-19	20/1	13	1+1-	14			5.55
4.00	VAV-20	20/1	15	14	16	25/3	VAV-22	5.33
0.00	SPARE	20/1	17	144	18			5.33
0.00	SPARE	20/1	19	1+1-	20	20/1	SPARE	0.00
0.00	SPARE	20/1	21	14	22	20/1	SPARE	0.00
0.00	SPARE	20/1	23	144	24	20/1	SPARE	0.00
0.00	SPARE	20/1	25	1+1-	26	20/1	SPARE	0.00
0.00	SPARE	20/1	27	14	28	20/1	SPARE	0.00
0.00	SPARE	20/1	29	144	30	20/1	SPARE	0.00
0.00	PROVISION	-	31	]+ -	32	-	PROVISION	0.00
0.00	PROVISION	-	33	] 🕌	34	-	PROVISION	0.00
0.00	PROVISION	-	35	]	36	-	PROVISION	0.00
0.00	PROVISION	-	37	] 🕌	38			26.32
0.00	PROVISION	-	39	] 🕌	40	150/3	LPC	26.33
0.00	PROVISION	-	41	]++-	42			26.32
						GROU	ND BUS	
		TOTAL CONI TOTAL E					TOTAL DEMA	ND AMPS: 190.26

COMMENTS:	SURFACE NEW PANELBOARD	. ROOM				OCP: MAIN:	150A MLO		NORMAL	
KVA:	DESCRIPTION:	CB:	CCT:	N —•	CCT:	<u>CB:</u>		DESCRIPTION:	KVA:	
5.00	VAV-26	25/1	1	<del> </del>	2				7.33	
4.00	VAV-27	20/1	3		4	35/3		VAV-4	7.33	
3.00	VAV-30, 31, 34	20/1	5		6				7.33	
4.00	VAV-32, 33	20/1	7		8	20/1		VAV-5	2.00	
4.00	VAV-35	20/1	9		10	25/1		VAV-6	5.00	
5.00	VAV-36	25/1	11		12	25/1		VAV-7	5.00	
3.00			13		. 14	-		PROVISION	0.00	
3.00	VAV-28	20/3	15		16	-		PROVISION	0.00	
3.00			17		18	-		PROVISION	0.00	
3.66			19	+	20	-		PROVISION	0.00	
3.66	VAV-29	20/3	21		22	-		PROVISION	0.00	
3.66			23		24	-		PROVISION	0.00	
0.00	SPARE	20/1	25	$\downarrow$	26	-		PROVISION	0.00	
0.00	SPARE	20/1	27		28	-		PROVISION	0.00	
0.00	SPARE	20/1	29		30	-		PROVISION	0.00	
0.00	PROVISION	-	31	$\downarrow$	32	-		PROVISION	0.00	
0.00	PROVISION	-	33	+	34	-		PROVISION	0.00	
0.00	PROVISION	-	35		36	-		PROVISION	0.00	
0.00	PROVISION	-	37	+++	38	-		PROVISION	0.00	
0.00	PROVISION	-	39		40	-		PROVISION	0.00	
0.00	PROVISION	-	41		42	-		PROVISION	0.00	
					-	GROUN	ID BUS			

## FOR CONSTRUCTION

o ue

one eighth inch = one foot

0 4 8 16

VA FORM 08-6231

**CONSULTANTS:** FINAL CD SUBMISSION 03-29-13 Date Revisions:



1 2 5 7

ARCHITECT/ENGINEERS:
FREDRICK, FREDRICK & HELLER ENGINEERS, INC.
672 EAST ROYALTON ROAD BROADVIEW HTS., OHIO 44147 TEL (440) 546-9696 FAX: (440) 546-9699

Drawing Title POWER DISTRIBUTION ONE-LINE DIAGRAM Approved: Project Director

VAMC UPGRADE LEARNING **EXCHANGE - PHASE 2** 10701 E. BLVD., CLEVELAND, OHIO 44107

MPL

03/29/13

541-13-106 Building Number Drawing Number 1-E6 Checked By Drawn By JDM

Department of Veterans Affairs

Office of

Construction

and Facilities

Management